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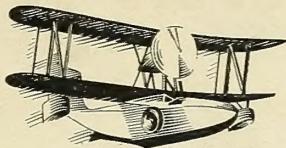


# Just the Ship for a flying visit

WITH a Keystone-Loening Amphibian Commuter riding at anchor by the water gate, or poised skyward on the lawn, the alert society leader enjoys a new freedom in planning and filling her engagements.

Luncheon at Greenwich, a fete at Narragansett, are quite compatible with a mid-morning dip at Southampton. North Shore, South Shore, all around the Sound, your friends can be your neighbors even if their place be 100 miles or more from yours.

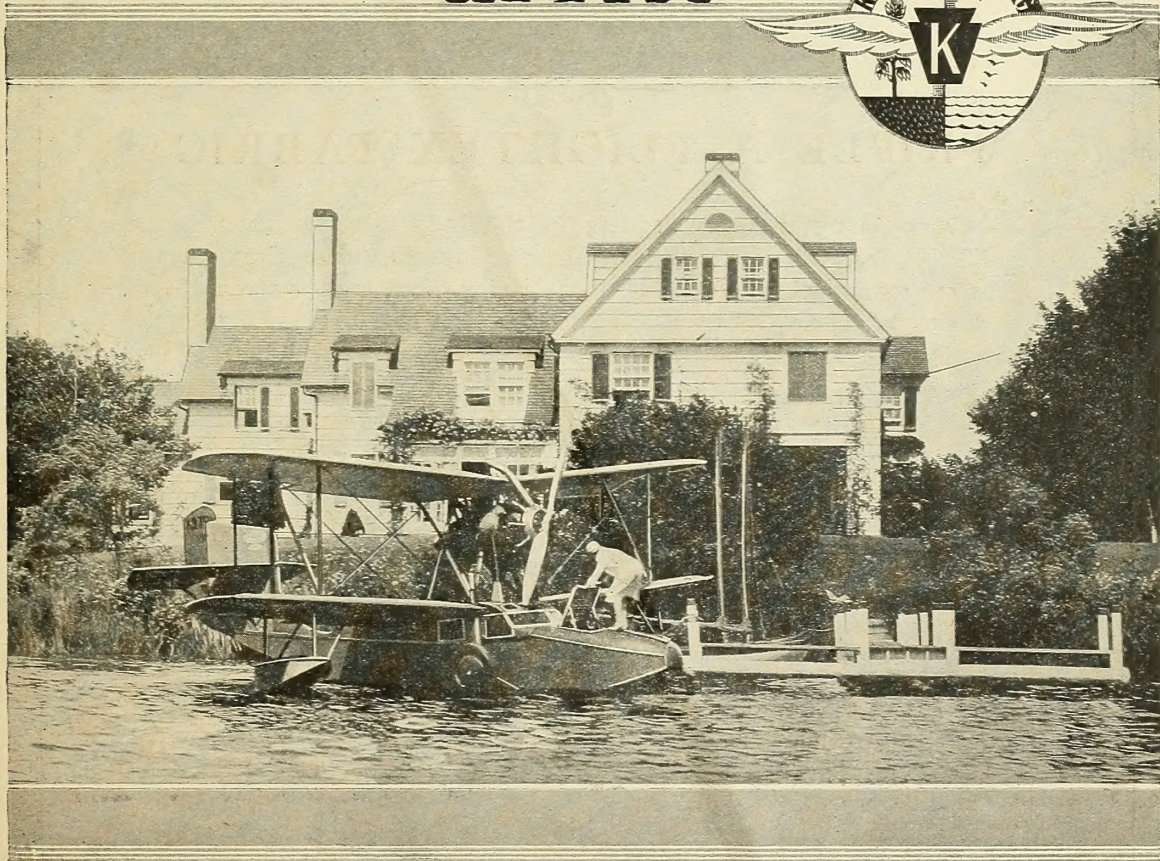
Loening, leading designer of amphibian planes, planned this four-seater Sport Amphibian for "flying visits." No need for special flying togs. Whether you are bound for tennis-tea or supper-dance, the comfortable all-metal cabin carries you, and your finery, unruffled. You travel swiftly, privately, away from contact with earthly crowds, alighting rested and refreshed.



Of course, the males of the household will want to "charter" your Commuter for foursomes—golf, fishing or hunting. It brings so many new worlds within range of busy sportsmen. And there's plenty of room aft for the dunnage.

The Commuter is safe and easy for women to fly. The dual controls enable your guests to spell you at the wheel. With 300 H. P. at your command you take to the air in 7 to 10 seconds, climb to 15,000 feet if you care to, speed to your goal at the rate of a mile and a half each minute.

Further details about the new Keystone-Loening Commuter will gladly be furnished by our nearest distributor.




## KEYSTONE-LOENING AMPHIBIAN COMMUTER

KEYSTONE AIRCRAFT CORPORATION  
SALES OFFICES: 31st STREET & EAST RIVER, NEW YORK  
PLANTS: BRISTOL, PENNA., AND NEW YORK CITY

PRICE  
\$16,800

Distributors: NEW YORK, Cox & Stevens Aviation Corp.; BOSTON, East Coast Aircraft Sales Corp.; PHILADELPHIA, Ludington Philadelphia Flying Service; CLEVELAND-DETROIT, Thompson Aeronautical Corp.; PITTSBURGH, Pittsburgh Aircraft Agency Corp.; CHICAGO, Continental Air Services, Inc.; MONROE, LA., Delta Air Service, Inc.; LOS ANGELES, W. E. Thomas; SEATTLE, Gorst Air Transport, Inc.





# FLIGHTEX PRODUCTS

REGISTERED U.S. PAT. OFF.

## The New FLIGHTEX AAA\* FABRIC COVERS

### • ST. LOUIS ROBIN •

on its world's record-breaking endurance flight of 420  
hours, or more than 2½ weeks of sustained flight.

## TRIPLE A FLIGHTEX FABRIC

is now being used by leaders in the industry. In choosing TRIPLE A, Curtiss Robertson Airplane Manufacturing Company saved many valuable pounds of weight without loss of strength, due to the fabric's inherent efficiency and its ability to give a lighter and yet perfectly doped surface with unprecedented economy.

\*Reg. U. S. Pat. Off. Pndg.

Manufactured by

✿ E. S. TWINING & COMPANY ✿

320 BROADWAY  
NEW YORK CITY



#### Distributors of FLIGHTEX Products

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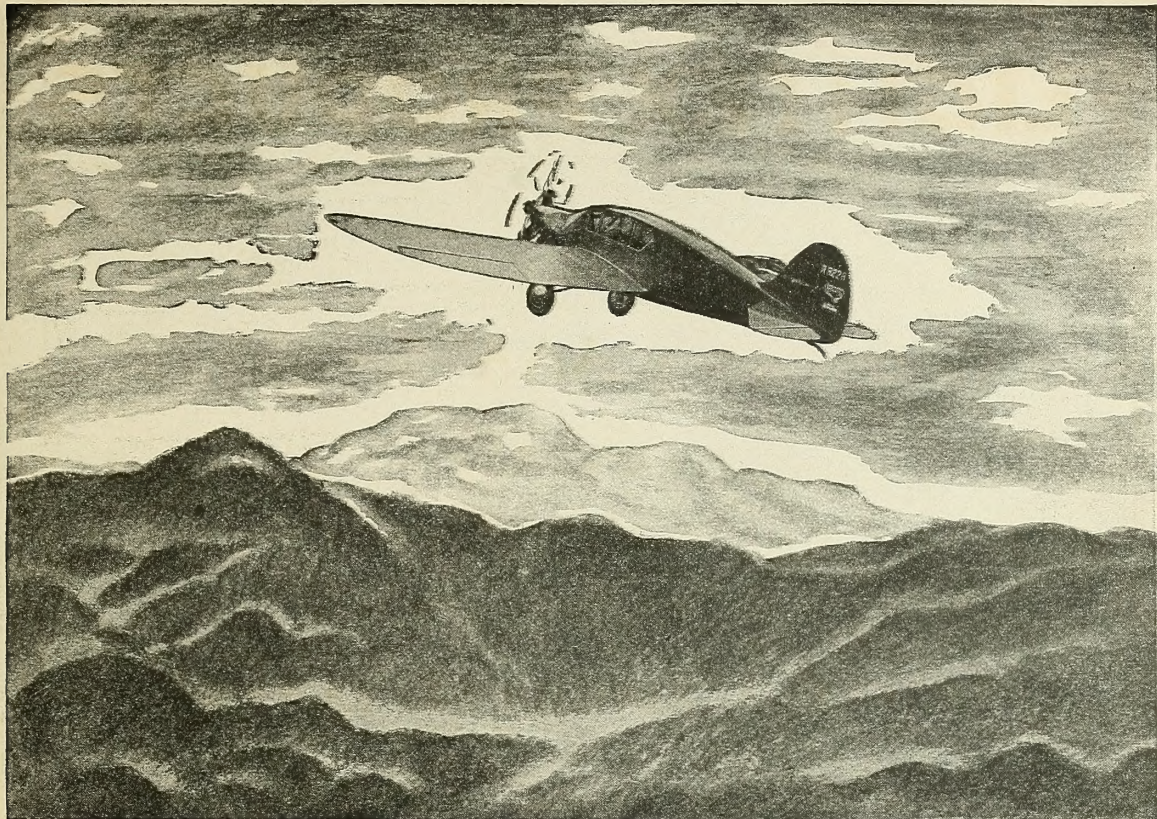
PACIFIC AIRMOTIVE CORP.  
3417 Angeles Mesa Drive, Los Angeles, Calif.,  
also Metropolitan Airport, Los Angeles, Calif.

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SOUTHERN AERMOTIVE SERVICE, Inc.  
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## In-Built Accuracy

**R**EMARKABLE for its ease of maneuverability and every-day utility, the new Eaglerock Bullet monoplane includes Consolidated instruments as standard equipment. As with numerous other leading airplanes, Consolidated supplies Eaglerock Bullets with that high degree of accurate performance long since expected as a matter of course from Consolidated instruments.

Ever since their first adoption years ago by the military air services, and during their long serv-

ice in many types of commercial aircraft, they have consistently advanced their prestige as steady nerves of the plane till today Consolidated is synonymous with the most scientific instrument performance.

Through precision manufacture, exacting inspection, and vigorous testing, Consolidated's three manufacturing divisions—Julien P. Friez & Sons, Inc., the Aircraft Control Corp., and the Molded Insulation Co.—build accuracy into every Consolidated instrument. That is why under all flying conditions each instrument justifies the pilot's unwavering trust in its efficiency.

**CONSOLIDATED  
INSTRUMENTS**

CONSOLIDATED INSTRUMENT CO. of AMERICA, Inc.  
305 East 47th Street, New York City

*Manufacturing Divisions*  
Julien P. Friez and Sons, Inc., Baltimore, Md.  
Molded Insulation Co., Mt. Vernon, N. Y.  
Aircraft Control Corp., Philadelphia, Pa.

### DEALERS

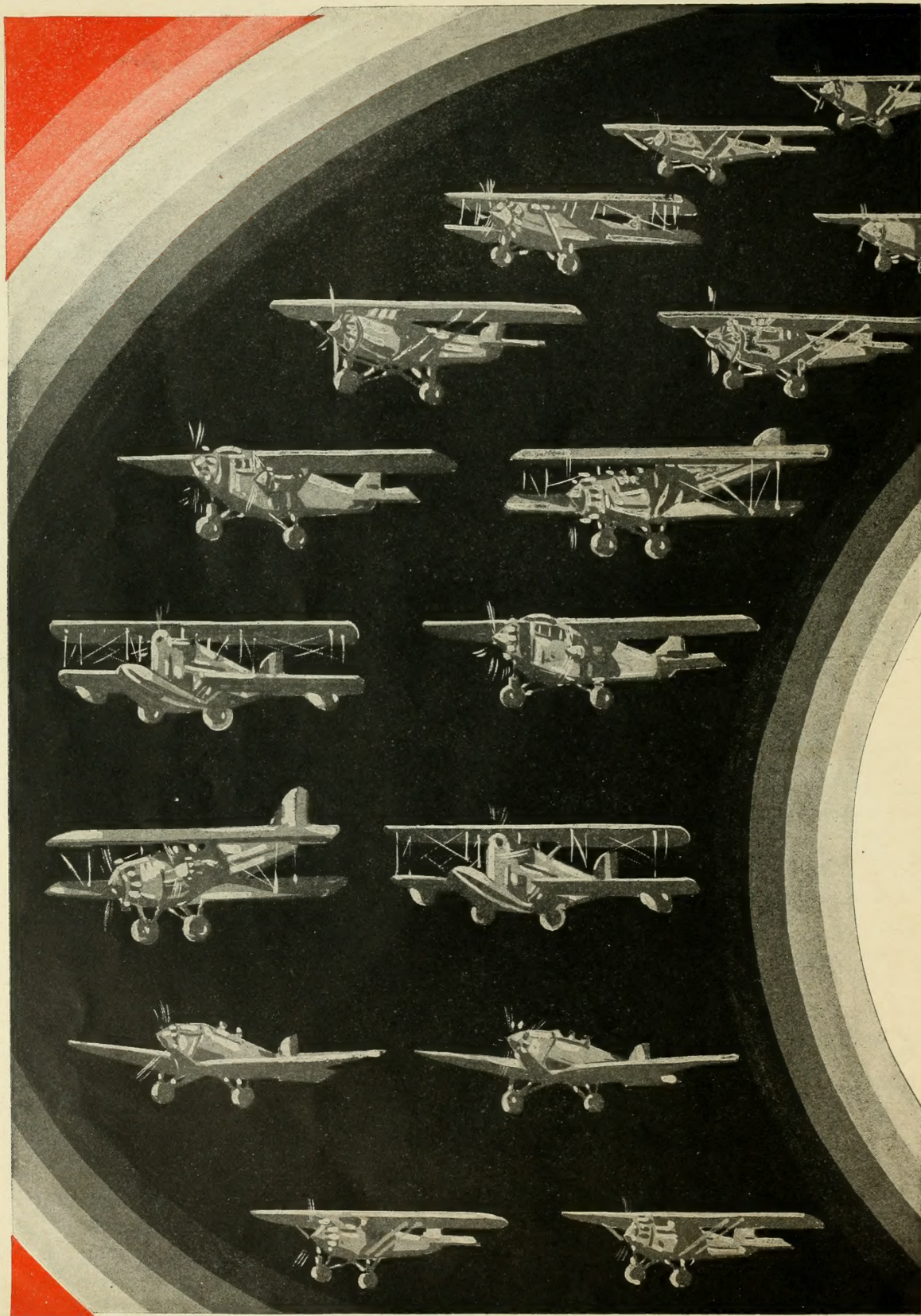
Your territory may still be open. For complete details, fill out and return the coupon.

Consolidated Instrument Co. of America, Inc.  
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give me full details of your dealer proposition.

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City \_\_\_\_\_ State \_\_\_\_\_  
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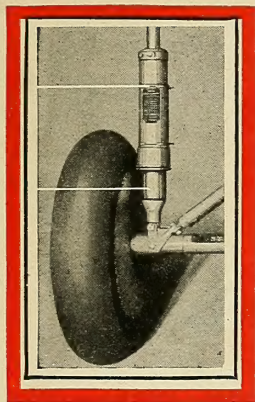
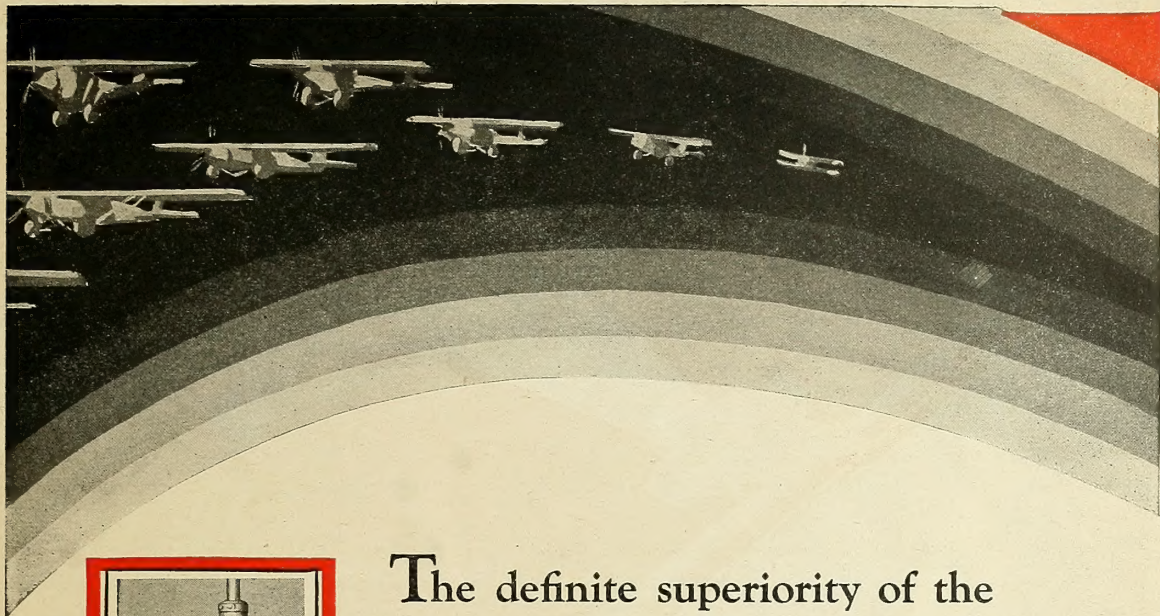






Say you saw it in AERO DIGEST





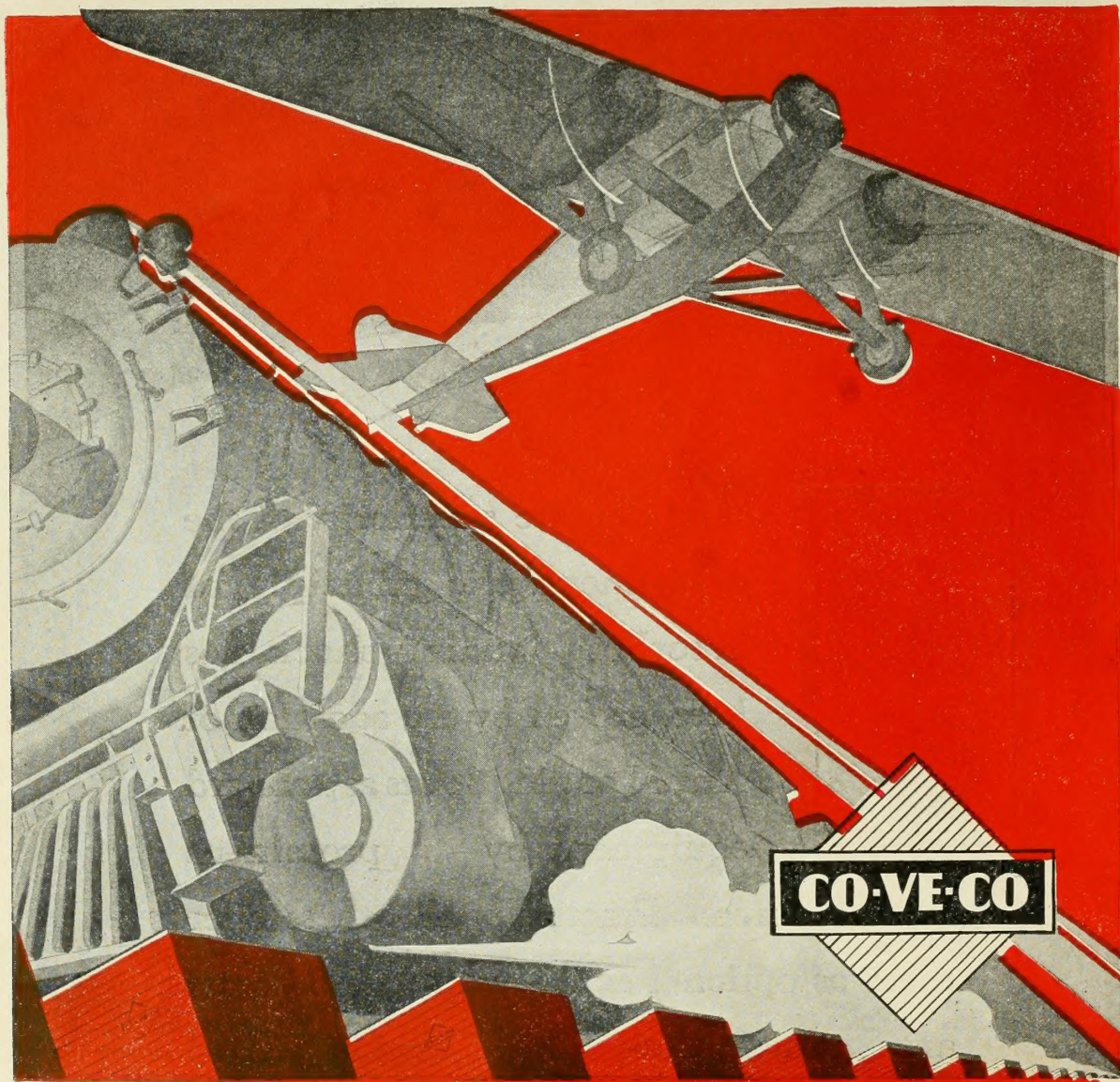
The definite superiority of the oleo-pneumatic principle of absorbing landing shock has been proven by the adoption of Aerol Landing Struts as standard equipment by **23** prominent manufacturers. Practically all others offer them as optional equipment. Aerol Struts are manufactured by The Cleveland Pneumatic Tool Co., Cleveland, Ohio.

See the Aerol Strut Exhibit at the  
National Aeronautical Exposition.

**AEROL** *shock absorbing* **STRUT**



## THE BACH TRANSPORT AND SANTA FE'S CHIEF.



**CO-VE-CO**

## BOTH RIDE ON PORT ORFORD CEDAR

**T**HE same everlasting quality in Port Orford Cedar that has kept untreated ties on Santa Fe roadbeds for sixteen years without replacement, altho exposed to nature's merciless elements...is found in the stout Bach wing!

Co-Ve-Co Plywood used by Bach and other aircraft manufacturers, is made from carefully selected Port

Orford Cedar. Cut from cold, *unsteamed* logs it retains nature's tremendous ingrained strength, and yet it is extremely light in weight! Its veneered panels may be precision-peeled to a tolerance of .001 of an inch in sheets *unmarred* by even the slightest imperfection. Send for samples, and then specify in your next order — "Co-Ve-Co" Plywood!

### PORT ORFORD CEDAR PRODUCTS COMPANY

Marshfield, Oregon

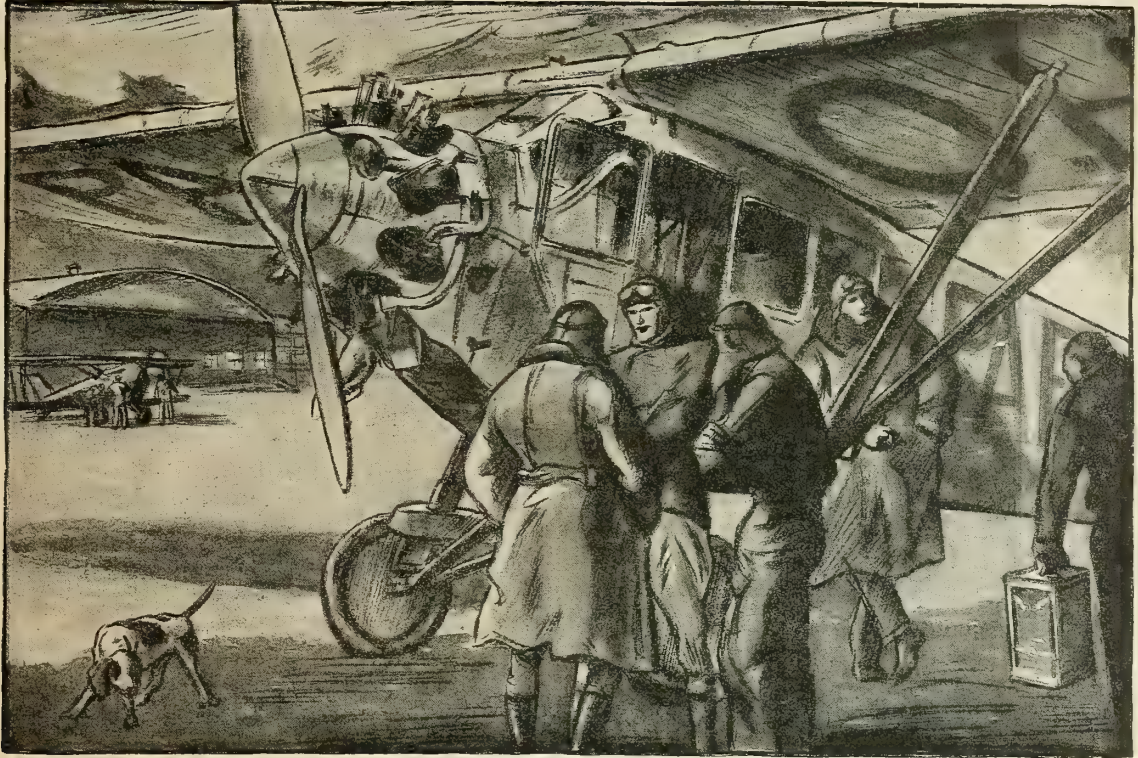
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DANT & RUSSELL, INC.  
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## GETTING OFF TO A GOOD START

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Valve Spring  
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Also  
-TP- Aero  
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**T**HE pilot who shoves off with -TP- Aero Motor Lubricating Oil in his engine has this advantage: he knows he is not going to have to worry about his oil. He has side-stepped a lot of unnecessary risks.

-TP- Oils are new—the latest development in scientific lubrication. They have been tested and approved by leading manufacturers of airplane engines and by many leading pilots. They are straight-run oils, not blended or compounded, produced from pure, paraffine-base crude by a process for which patents are pending.

This process has marked advantages

over other methods. It removes all the paraffine wax, while preserving all the lubricating bodies in the crude. Elimination of the wax is responsible for its low cold test.

In terms of performance this means uniform viscosity at all working temperatures, minimum carbon deposit and ignition trouble from fouled spark plugs, easy cold priming, immediate oil pressure, perfect lubrication winter and summer, on the ground or at high altitudes,—a maximum of safe flying hours.

A handsome, practical *Pilot's Log Book* sent free on request. Write us for your copy today.

TEXAS PACIFIC COAL AND OIL COMPANY  
FORT WORTH, TEXAS

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# -TP-AERO MOTOR LUBRICATING OIL

REG. U. S. PAT. OFF.





## *New standards of sport and training plane performance stability and safety*

You don't know what truly up to date sport and training plane performance can be until you have seen and flown the new Arrow Sport *Pursuit*. Kinner powered for 110 easy miles per hour *and more* . . . cruises at 95 . . . handles with the ease and steadiness which have made the Arrow Sport a byword among pilots for quick maneuverability and remarkable stability.

*America's Finest Sport and Training Plane*



From nose to tail skid the Arrow Sport is built with a ruggedness far in excess of Department of Commerce requirements. Pound for pound there is no sturdier ship in the air—nor a safer ship for training and all around sport flying. Safer because of its structural strength . . . its proven stability . . . and the low landing speed and fast climb which take it safely in and out of the smallest fields.

Arrow Sport refinements include wide landing gear built for the shocks of student landings and rough fields . . . taper wing of full cantilever design for maneuverability and strength . . . two independent and positive acting control systems with either stick removable . . . self aligning babbitt lined bearings for control rods . . . the comfort of a big, roomy cockpit with ample leg room and removable cushions to permit the use of pack 'chutes.

The Arrow Sport franchise offers The Arrow Sport 60—The Arrow Sport 90 (Le Blond motors)—The Arrow Sport Pursuit (Kinner motor) in a price range from \$3485 to \$4565. Backed by a factory with unexcelled resources and a production of 3 ships a day, it provides remarkable opportunities for qualified dealers and distributors in a few territories still available. See the Arrow Sport at the Cleveland show or wire for details of the liberal Arrow Sport franchise.

### Specifications:

Span, top wing—25 ft. 10 in.; bottom wing—25 ft. 4 in.; Wing area 178 sq. ft.; Length overall—19 ft. 3 in.; Height—8 ft.; weight empty—995 lbs.; gross weight with full load—1550 lbs.; Power loading—15.5 lbs. per h. p.; wing loading—8.2 lbs. per sq. ft.; safety factor 8 to 1.

Performance: Top speed—110 m. p. h.; Cruising speed—95 m. p. h.; take off—150 ft.; landing speed—40 m. p. h.; climb (first minute)—1200 ft.; service ceiling 14,000 ft.; range—300 to 400 miles.

Equipment—Tachometer, altimeter, oil pressure gauge, engine thermometer, gasoline gauge, choke, throttle and ignition control, navigation lights, Pioneer compass.

Price \$4565 Flyaway

ARROW AIRCRAFT AND MOTORS CORPORATION  
Havelock, Nebraska



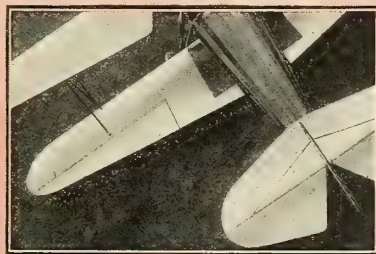
Safer landings with an unusually wide and husky landing gear.



The spring tail skid is set in shock eliminating rubber.



Comfortable room for two in the well protected cockpit.



Big control surfaces for slow landings. Taper wing for maneuverability and speed.



# C.W. "SPEED" HOLMAN

## FIRST with NATURALINE

### Harner Cup Race May 31st



**1st**

Flying a Laird, powered with a T-4 Wright Whirlwind motor and fueled with NATURALINE, "Speed" Holman flew the 468 miles to Indianapolis and return, in 2 hours, 58 minutes and 40 seconds — an average speed of 156 miles per hour.

"I opened the throttle wide," "Speed" said, "and kept her there all the way."

Mr. Holman, who is operating manager of the Northwest Airways, St. Paul, Minnesota, made a test with NATURALINE shortly before he entered the race and stated that it revved up his Hornet engine at least 60 R.P.M. And after the race he remarked that he believed NATURALINE was "the finest fuel available for aviation purposes at this time."

# N A T U R



Fueling "Speed" Holman's Laird

Mr. E. Roy Alexander, Race Manager, wired us after the race as follows:

GARDNER TROPHY RACE TODAY STOP NINE SHIPS STARTED FIVE FUELED WITH NATURALINE WINNING FIRST SECOND THIRD AND FOURTH PLACE STOP FIFTH SHIP FUELED WITH NATURALINE DOWN DUE TO FABRIC BLOWN OFF FUSELAGE STOP GREAT VICTORY FOR WONDERFUL FUEL CONGRATULATIONS.



Product of  
**NATURALINE COMPANY OF AMERICA**  
 Chestnut & Smith Building  
 TULSA, OKLA.



## SYDNOR HALL

**SECOND** *with* **NATURALINE**

Sydnor Hall flew a Travelair, powered with a T-5 and fueled with NATURALINE. He dived onto the Parks airfield seventeen minutes after "Speed."

Mr. Hall also was enthusiastic about NATURALINE. After the race in a letter to us he said, "I believe that this gasoline is the best gasoline made for aeroplanes at the present time. I particularly wish to emphasize the fact that NATURALINE is considerably lighter than the average and therefore should be especially adaptable for aeroplanes in which a minimum of weight is desirable."

Close upon Sydnor Hall's heels came Arthur J. Davis, flying a Waco powered with a T-5 Whirlwind and fueled with NATURALINE.

**A L I N E**

## ART DAVIS

**THIRD** *with* **NATURALINE**

Then came John P. Wood two minutes later, in a Waco T-4, also fueled with NATURALINE.

A fifth plane fueled with NATURALINE, was forced down because the fabric was torn from the fuselage, forty miles from the finish. This was Irvin T. O'Dell's Cessna. Mr. O'Dell was in second place when the accident happened.

Five out of nine planes were fueled with NATURALINE, four of which took the leading places.



Fueling Sydnor Hall's Travelair

*Pictures show the fueling of the different planes with NATURALINE*



Fueling Art Davis' Waco



# LOOKING UPWARD AND FORWARD . . . .

We face the coming years with confidence, eagerness, expectation. We have the faith that has removed mountains, harnessed rivers, dug canals, erected skyscrapers—faith that is reflected by increasing thousands who look upward to new pathways of travel—faith in the belief that men of commerce see new economy, new satisfaction in transportation by air.

And this faith is the natural result of Travel Air's accomplishments. Five years of phenomenally swift growth from obscurity to leadership is Travel Air's history . . . five years of achievement . . . five years of building a reputation for dependability in Travel Air planes that is second to none in the entire field of aviation.

Dependability in every structural detail of Travel Air Number One (produced in 1924) enabled this famous plane to complete 1750 hours of flying without a single replacement. Dependability of this type

THE STANDARD OF  
AIRCRAFT COMPARISON



**A PLANE FOR**





**EVERY PURPOSE**

TRAVEL AIR, WITH 17 APPROVED  
TYPE CERTIFICATES, LEADS THE  
INDUSTRY BY A WIDE MARGIN

won first place for Travel Air in the Ford Reliability Tour of 1926; in the Dole Race of 1927. Best of all, this dependability has developed public confidence with the result that today one-fourth of the airplanes used in America were built by Travel Air.

From an obscure Wichita workshop to a modern, fully equipped factory occupying a floor space of 116,000 square feet—such is Travel Air's splendid record of expansion. From one plane to a complete line, including twelve types that meet every transportation requirement—such is Travel Air's astonishing record of production.

Reliable business men, with or without automotive experience, are invited to write for complete information about the Travel Air Company—its plans, its policies, and the genuine opportunity offered by the Travel Air Sales Franchise.



Send for the story of Travel Air (new edition) free on request—illustrates and describes three types of dual control cabin monoplanes and eight types of open cockpit 3 place biplanes—also takes you through the Travel Air factory with illustrations and full description of manufacturing processes. Write dept. A-9

# TRAVEL AIR COMPANY

WICHITA

KANSAS



# Presenting

## THE IMPROVED AXELSON ENGINE

CLEVELAND  
August 24 to Sept. 2



*A* XELSON has added marked improvements to their seven-cylinder radial, air-cooled Engine. This improved engine will be presented at the Cleveland Show, August 24 to September 2.

Judgment of its quality is left in your hands. Inspect it critically. Examine the improved features closely. Observe their simplicity. Note the symmetrical balance and compactness of the entire engine. Simply give the engine the "third degree" of quality analysis.

Within its class it out-performs every motor in point of power, flexibility, acceleration and economy of gasoline and oil. Watch Axelson performance in the races and in the demonstration tests. But above all, see the Engine at the Axelson booth. It is destined to be the talk of the Show.



### Axelson Aircraft Engine Co.

Factory and General Offices  
Corner Randolph St. and Boyle Ave.  
Los Angeles, California  
(P. O. Box 337)

## AXELSON AIRPLANE ENGINES



# KEYSTONE-LOENING AMPHIBIAN "AIR YACHT"

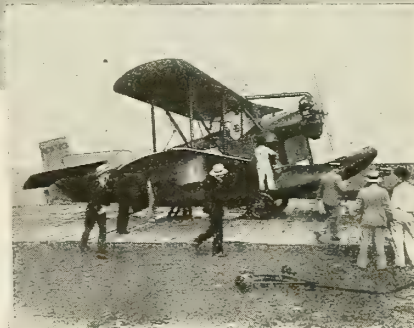


## AMPHIBIAN TRANSPORT

By bringing the passenger closer to the centers of great cities, both on the water front and the landing field, the amphibian plane saves the minutes that often make air travel worth while. Of this type of plane, transport executives unhesitatingly select the Keystone-Loening Air Yacht for daily passenger service. It is the one amphibian that has been thoroughly proven in millions of miles of flight. Its smoothness and steadiness, its ability to ride out rough weather in the air or on the water, its cheerful, quiet cabin, its low maintenance cost—far lower than any other amphibian used in transport work—these are the results of its basically sound design and the experience gained in years of practical operation. From the Atlantic to the Pacific, from Alaska and Canada to Central America, the Keystone-Loening Air Yacht is the symbol of safe, swift, direct transportation in the service of leading air lines.

6 to 8 passengers : 525 H. P. : 100 M. P. H., Cruising : \$27,900

**KEYSTONE AIRCRAFT CORPORATION**  
SALES DEPT.—31ST STREET AND EAST RIVER, NEW YORK  
PLANTS—BRISTOL, PENNSYLVANIA, AND NEW YORK CITY



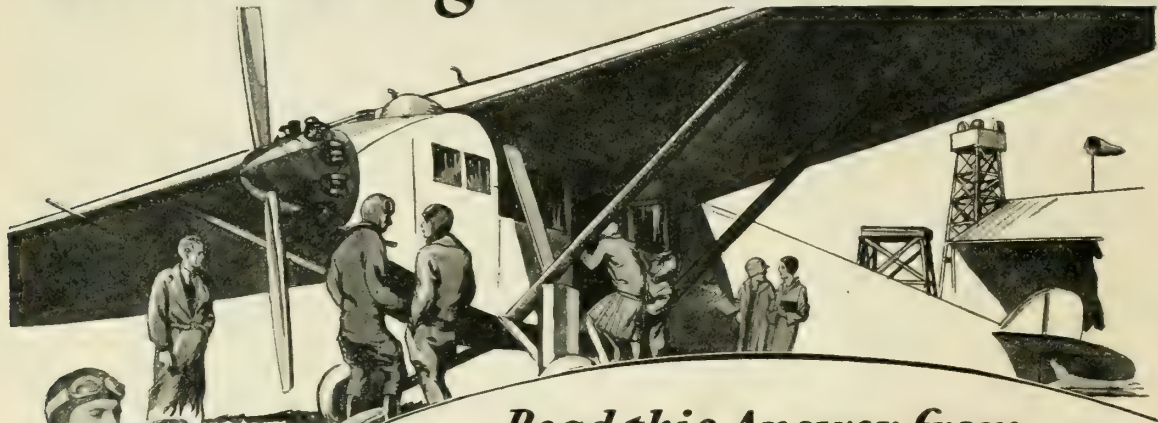
LARGE VIEW : Keystone-Loening Air Yacht on the Thompson Aeronautical Line, arriving at Cleveland from Detroit.  
SMALL VIEW : Passengers debarking at Cleveland.

### THESE SUCCESSFUL LINES USE AIR YACHTS

American Air Express • Continental Air Service  
Curtiss Flying Service • Gorst Air Transport  
Imperial Airways of China • International Airways  
of Canada • Mexican Aviation Corporation • New  
York and Suburban Air Lines • Pan-American  
Airways • Pan-American Grace Air Lines • Pitts-  
burgh Aviation Industries • St. Louis Aviation  
Corporation • Thompson Aeronautical Corpora-  
tion • Wedell-Williams Air Service • Western  
Air Express.



# "How can I get into Aviation?"



## Read this Answer from A World Famous Trans-Atlantic Pilot

Aviation is waiting for no one! Too many millions of capital are already invested—the demand for air service of *every* kind is increasing too fast. Aviation demands men who **KNOW**. Men who can **DO**. Men who can step into the real jobs and command the real salaries. Landing fields, municipal airports, plane and equipment factories, air mail and passenger lines, service and sales organizations—all are leaping ahead in the fastest, most amazing development that any industry has ever known. In such racing, feverish activity, *where* is there any room for a man who has nothing to offer? An empty pocketbook is no drawback—but Aviation has no place, no patience, no *time* for empty hands or empty heads! Aviation is taking off for the greatest non-stop flight in history—and the men who will go along and climb to the top are the men with a foundation of **FACTS** under them.

### Walter Hinton

Walter Hinton was pilot of the famous NC-4, first plane to fly the Atlantic; he piloted the first plane from North to South America; he was first to fly to the headwaters of the Amazon. During the War he was a crack flying instructor for the Navy. Today—with a course that experts agree is the most complete and practical ever produced—Hinton is training keen-sighted men for the Big-Pay jobs in Aviation.

### Get his FREE Book

You Must be 18 or Over  
To take an active part in Aviation you must be at least 18 years of age. If you are under 18, please do not ask for Lieut. Hinton's book, because it will not interest you.

### You Don't Have to Fly; 40 Different Jobs On the Ground PAY BIG Too!

To succeed in Aviation—make **BIG MONEY**—you need not necessarily be a pilot. There must be many thousands of pilots, certainly. But for every plane that flies, there's an immediate need for trained men in more than *forty* different important jobs on the ground. Construction, motor and instrument experts—airport managers, service foremen, salesmen—all make *real* money. Some of them even bigger pay than pilots earn. But every last one of them must have the **FACTS**. Today's problem—**YOUR** problem—is to **LEARN** Aviation *quick*. And right there is where Walter Hinton is achieving the biggest success of his career.

### Get Your Ground Work NOW Right at Home—Hinton Is Ready to Train You

**YOU** can train at home in spare-time for the best paid jobs in the Industry. Hinton's proved course starts you at the beginning, trains you fast. You get *all* the facts about construction, rigging, motors, repairs, instruments, theory of flight, navigation, commercial Aviation—facts that *every* man must have to intelligently and profitably fill *ANY* job in the Industry. With this Institute's training you'll have your foundation, your *start*, for real accomplishment. Serious-minded—*air-minded*—men are reading and *acting* on the Free Book shown below. We want **YOU** to have a copy too! Send the coupon NOW.

### Aviation Institute of U. S. A.

Walter Hinton, President

1115 Connecticut Ave., Washington, D. C.

### Rush back to Washington Quick!

Walter Hinton, Pres.

Aviation Institute of U. S. A.

1115 Connecticut Ave., Washington, D. C.

Please send me at once your FREE Book "Wings of Opportunity," showing how I can get into this tremendous field.

Name .....

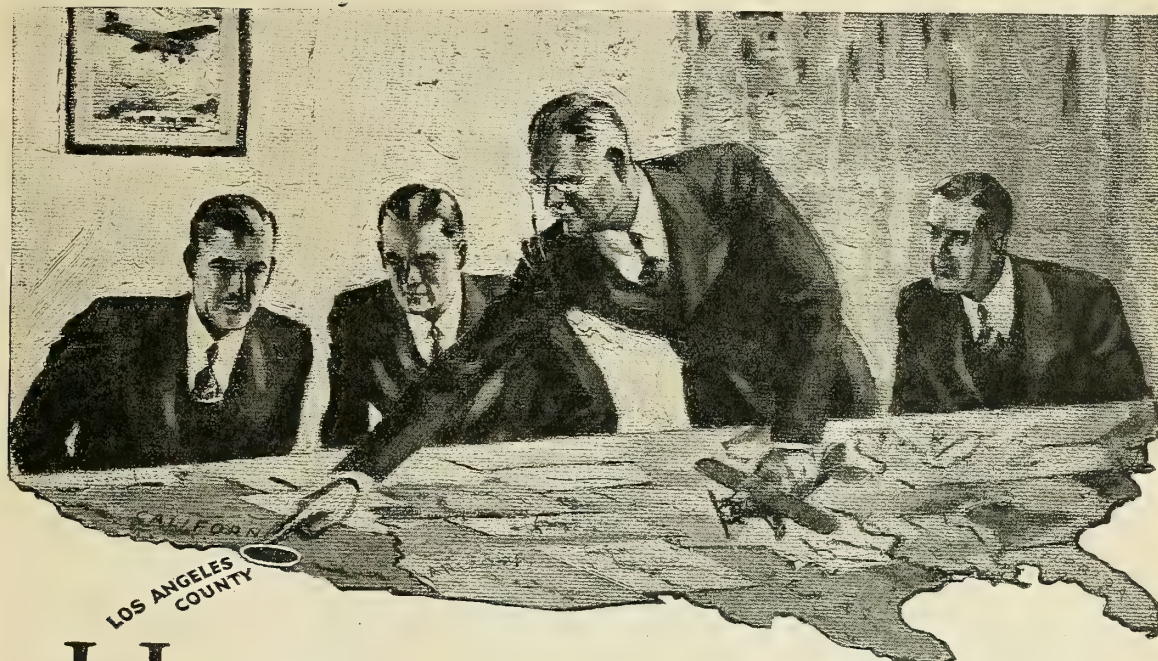
Street .....

City..... State .....

Age.....  
(must be over 18)

102-Y





# HERE, GENTLEMEN, *is the Ideal Spot* *in all America for the* Aircraft Industry

The remarkable industrial growth of Los Angeles County may be attributed to:

Natural year 'round climatic advantages

Tremendous population growth

High per capita buying power

Abundance of contented labor

Low building costs

Low cost power

Largest concentrated market on Pacific Coast

Splendid transportation facilities

Economical access to Pacific Coast and export markets

Flying conditions are as nearly ideal the year 'round in Los Angeles County as anywhere in America.

U. S. Weather Bureau reports over the last 50 years show an average wind velocity of 5 miles per hour . . . 355 days per year with sunshine . . . 274 days per year when the temperature is neither above 80 nor below 40.

17 manufacturers of airplanes and 9 manufacturers of airplane motors have already located here.

There are 25 or more aviation schools, 2200 aviation students, and more than 3,000 pilots in Southern California.

6 passenger transport companies operate 11 regularly scheduled lines out of Los Angeles, which is the terminal for 4 air-rail and 2 air-mail lines.

These are facts which the manufacturer of aeroplanes, motors or parts can turn to his profit . . . for these conditions have a tremendous effect on production costs and successful operation . . . and they are not paralleled elsewhere in America.

*Air-Minded*



# LOS ANGELES COUNTY

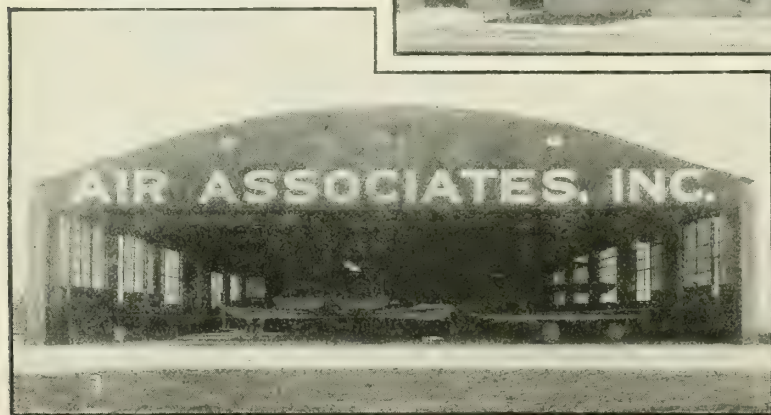
Complete detailed surveys and information supplied, upon request, by INDUSTRIAL DEPT., LOS ANGELES CHAMBER OF COMMERCE



## "A. A." Service in Chicago now in operation

THE photographs on this page show views of the new Air Associates' Service Station, now open, at the Municipal Airport in Chicago. In size, layout and equipment the building is probably the finest ever constructed for such a purpose on any airport in the U. S. It is equipped to the last detail for practical service to owners and operators of aircraft and is manned by

a staff of thirty men, including specialists in all branches of aircraft and engine work. "A. A." Service in Chicago will be the equivalent in every respect of the service that Air Associates has provided for years at Roosevelt Field, Long Island, and which has enjoyed such high standing throughout the industry.



Four views of Air Associates' Service Station at Municipal Airport, Chicago. 1. Stock room. 2. Exterior of building showing 200-foot frontage on 63rd Street. 3. Hangar entrance on the field. 4. Engine repair room.

The purpose of the Air Associates' organization at Roosevelt Field and at Municipal Airport, Chicago, is to furnish in service and equipment "Everything on the ground to keep your plane in the air." To this end, every facility is provided for the handling, storage, maintenance and repair of aircraft and engines. From the

simple tasks of fueling, washing or painting, to the complete rebuilding or assembling of an airplane, you can rely upon "A. A." Service.

For Service on  
FORD Airplanes and WRIGHT Engines  
look to Air Associates

And for supplies and spare parts, from the humble cowl pin to the heaviest unit, you will find "A. A." stocks complete both at Roosevelt Field and at Chicago.



*"Everything on the Ground  
to keep your plane in the Air"*



SERVICE STATION  
Roosevelt Field, Long Island

SERVICE STATION  
Municipal Airport, Chicago



## Get this Catalog

The new Air Associates' Catalog is complete. Only a service organization such as Air Associates, could so anticipate the needs of all engaged in aviation. Everything needed by the flyer, the mechanic, the operator and the airport superinten-



dent will be found listed, described and illustrated in this great new book. Every article presented in its pages has been thoroughly tested by "A.A." experts for practical efficiency and value. Get this complete, authoritative Catalog without delay. A copy is yours for the asking. Address Air Associates, Mail Order Department, either at Garden City, New York, or, 5300 W. 63rd St., Chicago.



### LEE FLYING SUIT

Popular side-opening style; easy to put on or off; equipped with hookless fastener; jam-proof and rust-proof; large double opening center pocket and two map pockets on legs. Kindly specify your height and chest measure. No. 2054. Light weight, white or khaki.

Price \$6.00



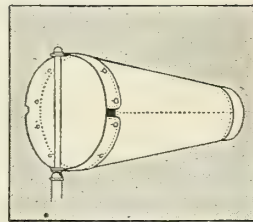
### "PRACTICAL FLIGHT TRAINING"

Splendid book by Lieut. Barrett Studley, U. S. N., formerly instructor Flying School at Naval Air Station, Pensacola. 424 pages, 160 illustrations, gives all principles of flight, maneuvers, aerobatics, landings, cross country flying, formation and night flying, aerial navigation, etc. Price \$5.00. Invaluable to the flyer.



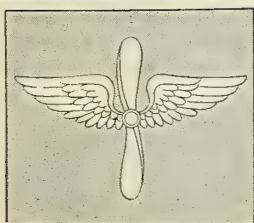
### FLIGHTEX SHIRTS

Made of the famous Flightex wing covering, except that the fabric is mercerized to a lustrous snowy white. Seven times more durable than ordinary shirting. In ordering, specify neck size and sleeve length. Price \$3.50



### WIND CONE

Heavily galvanized ring and pipe fittings; Dept. of Com. standard 18" diam.; chrome yellow, unbleached muslin cone, 94" long; buttons and button-holes permit disassembly for laundering. Complete with fittings . . . . . \$15.00



### INSIGNIA PIN

"Wings and Prop" design, 5/8" wide, model AS-3  
Gold plated front . . . . . \$ .35  
Gold plated on sterling silver . . . 75  
Solid green and white gold . . . 2.00



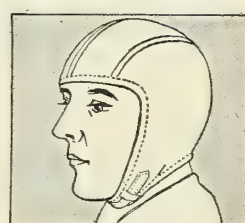
### PILOT LOG BOOK

Genuine black leather cover, stamped in gold lettering with words, "PILOT LOG BOOK," and handsome airplane design. Size 3 3/4" x 6". Space for 320 entries. Price \$1.20



### AIR TRAIL MAPS

Rand McNally State maps for pilots; include lists, indexes and descriptions of all airports; enable pilot to fly by compass or land marks; give data for establishing air routes and plotting courses; give air traffic regulations. Price, each state map .50



### CLOTH HELMET UNLINED

Made of white, soft gabardine, unlined. For mild weather use. In ordering, kindly state head size. Model 273. Price \$2.00

The eight articles listed and described above have been selected from the new Air Associates' Catalog as examples of hundreds of excellent values that are offered in its pages. We will be glad to fulfill your orders for such of these articles as you may have use for. You will find the coupon (at the right) convenient for ordering.

AIR ASSOCIATES, 5300 West 63rd St., Chicago; or Garden City, N. Y.  
Please ship me at once the following items as advertised in AERO DIGEST:

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I enclose remittance for full amount, less 2% cash discount — OR — I enclose herewith 25% of the total value of the order and agree to pay balance C. O. D.

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P. S. Don't forget to include a copy of your new catalog

# ASSOCIATES INC

EXECUTIVE OFFICES

MAIL ORDER DEPARTMENTS

535 Fifth Ave., New York City

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Two hangars at the Municipal Airport of Oakland, California, are covered with galvanized, corrugated ARMCO Ingot Iron sheets. Fireproof, weather-tight, rust-resistant, light in weight, yet sturdy, this practical type of hangar combines every desirable feature. Installed by the Herrick Iron Works, Oakland.



*That planes and equipment*  
may be  
**adequately protected**

### Where You Save With ARMCO Ingot Iron

Roofing and Siding  
Roofdeck  
Standard Metal Buildings  
Fuel Tanks  
Exhaust Pipe  
Firewalls  
Culverts  
Gutters  
Flashing  
Downspouts



**D**URABLE, economical protection for valuable planes and equipment requires such long-lived, dependable roofing and siding as rust-resisting ARMCO Ingot Iron.

As many port executives will testify, with their ARMCO Ingot Iron investment they obtain immunity from the hazards of lightning, fire, wind and rain. This sturdy covering, when properly applied, is long-time protection against the most vicious attacks of the elements.

And then, there is *rust-resistance*. ARMCO Ingot Iron is well-known as the metal that fights rust. It is virtually free from rust-promoting impurities. Moreover, the pure iron base is further shielded by a heavy, uniform galvanized coating. In the corrugated type of roofing and siding, deep, even corrugations contribute strength with sufficient flexibility.

Port executives, builders, and manufacturing companies will do well to investigate the advantages of ARMCO Ingot Iron weather protection. An ARMCO Development Engineer will gladly assist. Just communicate with the office nearest you.

### THE AMERICAN ROLLING MILL COMPANY *Executive Offices, MIDDLETOWN, OHIO*

Export: The ARMCO International Corporation

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# ARMCO INGOT IRON RESISTS RUST

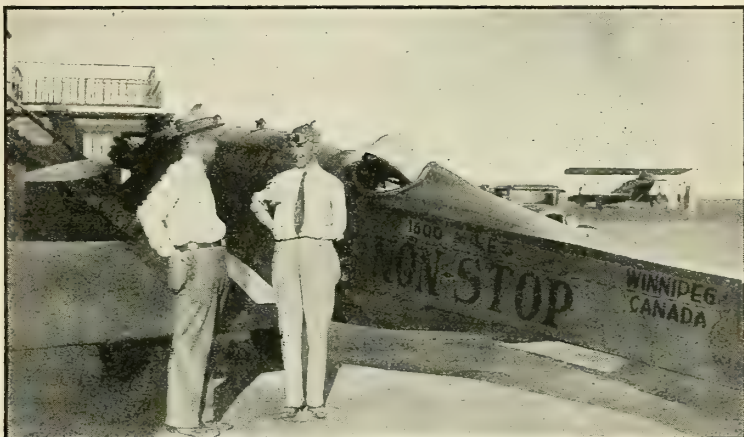


# HOW

## two new Light Plane Records were chalked up—

**T**WO new records for planes under 771 lbs. have been recorded, one the official American altitude record, the other the world's Non-Stop distance record. Both records were established by "Barney" Zimmerley, chief test pilot for the Nicholas-Beazley Airplane Company, Inc., in the Barling NB-3, low wing monoplane. The non-stop flight was made with a 60 H. P. LeBlond Engine, and the altitude record with an 80 H. P. Genet Engine. Both engines, lubricated with Kendall Oil, functioned perfectly throughout the flights.

The altitude flight took place on May



Upper view—P. O. Gibson, engineer of the Nicholas-Beazley Company, and "Barney" Zimmerley with the Barling NB-3 in which the non-stop distance record was achieved.

Lower view—"Barney" Zimmerley with the Barling NB-3 in which the American altitude record was established.



28th, over Parks Airport. A height of 20,862 feet was reached and the entire flight consumed 2 hours and 38 minutes. The Non-Stop flight took place July 7th. 1,600 miles was flown in 16 hours from Brownsville, Texas, to Winnipeg, Canada. The story of both flights is one of skilful, courageous piloting, sterling per-

formance of plane and engines, correct lubrication.

Kendall Oil stands up under grueling tests and has the extra margin of safety needed for severe duty. Extreme heat, severe cold, long hours of continuous usage—these things fail to lessen the efficiency of Kendall Oil—the oil that is refined from 100% Bradford Grade of Pennsylvania Crude. Kendall-lubricated engines are better protected and run smoother. They last longer and take you further. And thirty hours is the specified change period for Kendall Oil.

For a list of airports where Kendall Oil is now obtainable, address Aviation Division, Kendall Refining Company, Bradford, Pa.



# KENDALL OIL

Use the  
Air Mail!

REFINED FROM 100% BRADFORD  
GRADE OF PENNSYLVANIA CRUDE

{ See our Exhibit at the National Aeronautical Exposition, Cleveland, Ohio, August 24th to September 2nd }

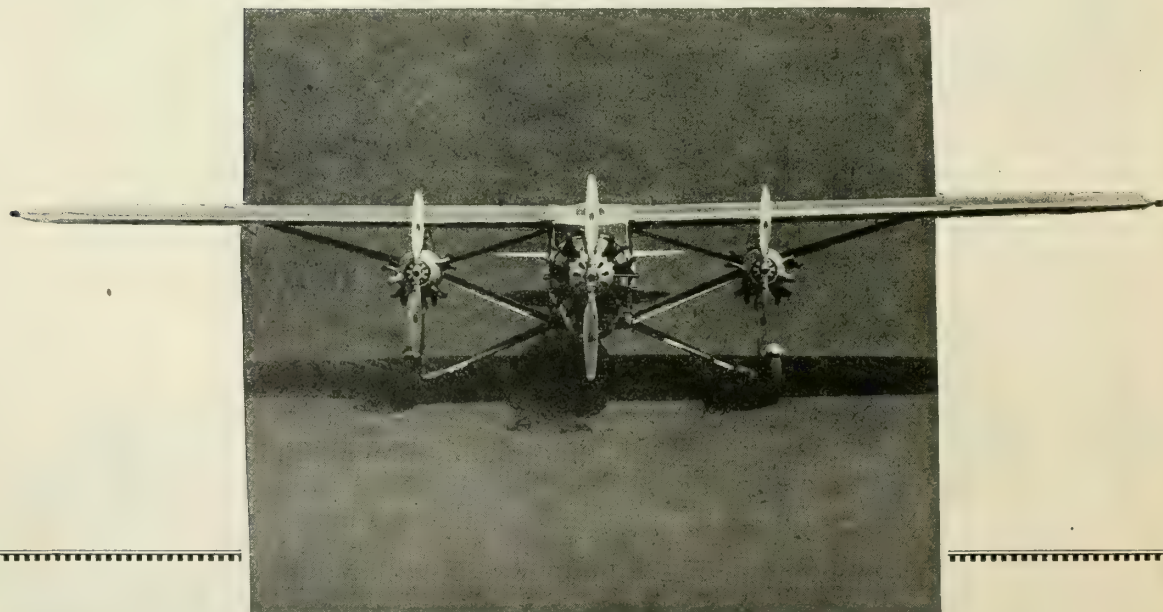




*The*  
**SCHLEE-BROCK CORPORATION**  
*of Detroit*

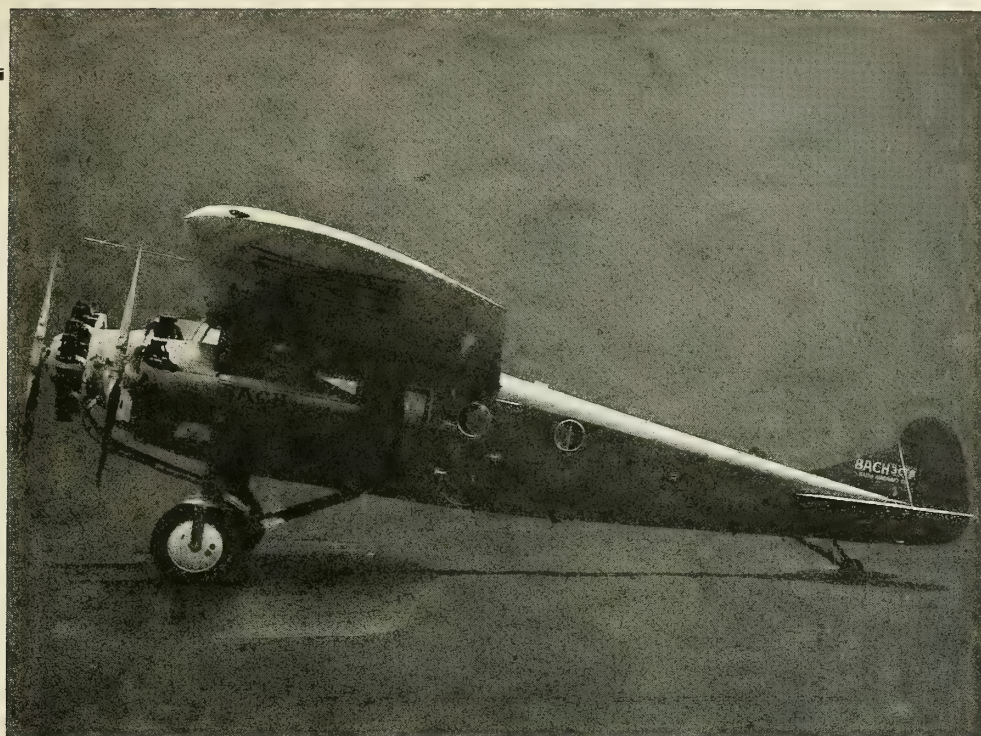
*EASTERN DISTRIBUTORS*  
*of the*

*BACH TEN PLACE*  
*TRIMOTOR TRANSPORT . . .*



Say you saw it in AERO DIGEST





*... Will be pleased  
to demonstrate our  
new model . . .  
by appointment or  
at the National Air  
Races in Cleveland.*

**BACH AIRCRAFT COMPANY, Inc.**

*Los Angeles Metropolitan Airport*

*Van Nuys, Cal.*





# "Travel Air" Endorses Heywood

## "Start-er by Heywood"



### Travel Air Company

Manufacturers of  
Travel Air Planes  
Wichita, Kansas

June 10th, 1929.

The Heywood Starter Co.,  
Detroit, Michigan.

Gentlemen:

We have used a number of your starters in the past year on the motors installed in our ships and to date we have not received any complaint whatsoever from any one of our customers. We believe that your starter is as good, if not better, than any other starter that we have used so far.

The service and courtesies you have extended us have been appreciated, and we hope that our relations in the future will be the same as they have in the past.

Yours very truly,

TRAVEL AIR COMPANY,

*R. W. Edwards*  
Purchasing Department.

RWE:RD

Right up in front with the other leaders in the Aircraft industry, Travel Air Company is abreast of every improvement and advancement.

They realize that something as modern as the aeroplane must be modern—or ultra modern—in every phase of its operation.

Starting an aeroplane therefore must now be a one-man job—automatic and instantaneous—regardless of severe cold or other

conditions—in other words, "IT is a job for the Heywood".

Average weight of the Heywood Starter installed is less than 30 pounds and it is so compactly built that it will fit into any installation.

The engine is turned over rapidly by compressed air forced on top of the pistons and sufficient carburetion injected on the compression strokes for positive instant ignition.

*Write for descriptive literature*

SKY SPECIALTIES CORPORATION

(Sky Service)

3651 Hart Avenue . . . Detroit

# HEYWOOD STARTER



# 4 reasons the Patrician attracts patronage



**P**ROSPECTIVE air passengers want to know—1. Is air travel safe? 2. Is it comfortable? 3. Will it save time? 4. Is it expensive?

The Keystone Patrician, great 20-passenger air liner, enables transport operators to answer satisfactorily just such questions as the foregoing.

*Safety.* Tens of thousands of miles of flying, from coast to coast and in daily transport service, have proven the staunchness and airworthiness of the Patrician; the unequalled reserve power of its three 525 H. P. engines. The Patrician is outstanding as a *safe* airplane.

*Comfort.* The cabin of the Patrician is roomy, well ventilated, attractive; the walls are noise-proofed; the seats are comfortable and afford plenty of leg room. Every convenience of the club car is provided. The pleasures of travel in the cabin of the Patrician are further enhanced by the steadiness in flight for which the great ship is noted.

*Speed.* Off the ground in 8 to 15 seconds and away with a high speed of 151 miles per hour, a comfortable cruising speed of 120 miles per hour, the Patrician wings its way at a faster clip than that of any other transport plane—as proven in actual service.

*Low Cost.* The Patrician provides the transport operator the opportunity of reducing passenger rates without loss of profit because of its exceptionally low operating cost—7 cents per passenger per mile with full load.

By thus fully meeting the requirements uppermost in the minds of prospective passengers, the Patrician can be depended upon to produce as well as to handle increased business for commercial air transportation companies . . . and at reduced cost.

## KEYSTONE AIRCRAFT CORPORATION

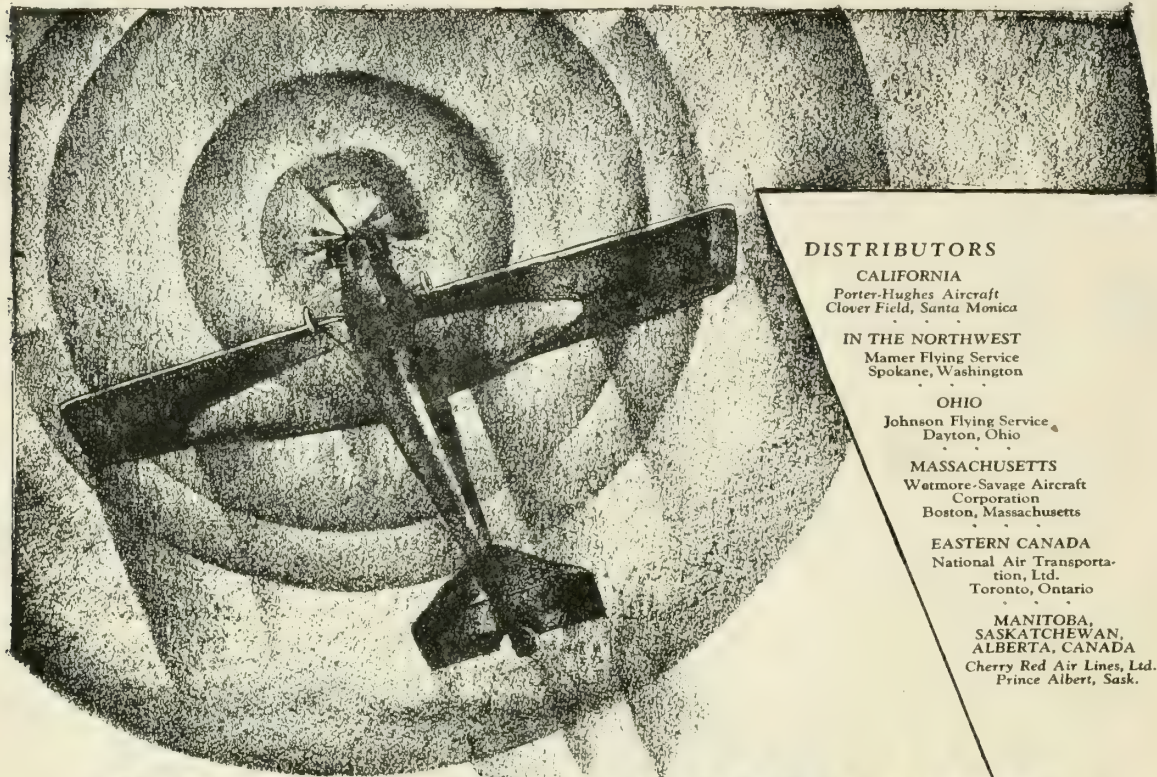
SALES OFFICES: 31st STREET & EAST RIVER, NEW YORK  
PLANTS: BRISTOL, PENNA., AND NEW YORK CITY



# KEYSTONE







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## CALIFORNIA

Porter-Hughes Aircraft  
Clover Field, Santa Monica

## IN THE NORTHWEST

Mamer Flying Service  
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## OHIO

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# RESPONSIBILITY

**E**ACH new plane that takes the air is an added responsibility for the manufacturer . . . the conscientious manufacturer . . . the manufacturer who expects to stay in business and be a real power in the industry tomorrow as well as today. One of the first laws of the Buhl Aircraft Company is that responsibility starts — not ends — on delivery. A widespread dealer organization maintains constant supervision of all Buhl planes in operation. Factory service and cooperation is always prompt, courteous and efficient. Buhl has learned what responsibility means through the 96 years during which the name has been identified with

progressive industry in many fields. Buhl planes today carry far more than the name alone—they preserve the priceless heritage of almost a century of manufacturing leadership and integrity. That, too, is a responsibility which cannot be ignored. This same sense of responsibility is preserved in all the relations of the Buhl Aircraft Co.—with its customers, with its sources of supply, with its competitors in the industry, and with the members of its own organization and its distributors. A Buhl franchise is a profitable franchise, because it is founded upon a sound basis. Write today for catalogs or details of our attractive dealer plan.



**BUHL Aircraft Company**  
MARYSVILLE, MICHIGAN



# AIR INVESTORS

## INCORPORATED

---

OWNING securities of 31 enterprises, the corporation gives to its stockholders a diversified investment in aviation based on sound research and analysis.

MANAGED by a Board of Directors of men outstanding in aviation and successful in other nationally known organizations, the corporation is assured of close contact with the industry combined with independence of judgment and action in the investment of its funds in new or developed enterprises.

INVESTMENTS are diversified amongst the industry's various activities including aircraft manufacturing, transport operations, airports, engine manufacturing, accessories and other allied operations. Not over 5.5% of the corporation's assets were invested in any one enterprise on July 31, 1929.

ASSETS as of July 31, 1929 exceeded \$5,200,000, without including unrealized book profit on securities owned.

### — [ DIRECTORS ] —

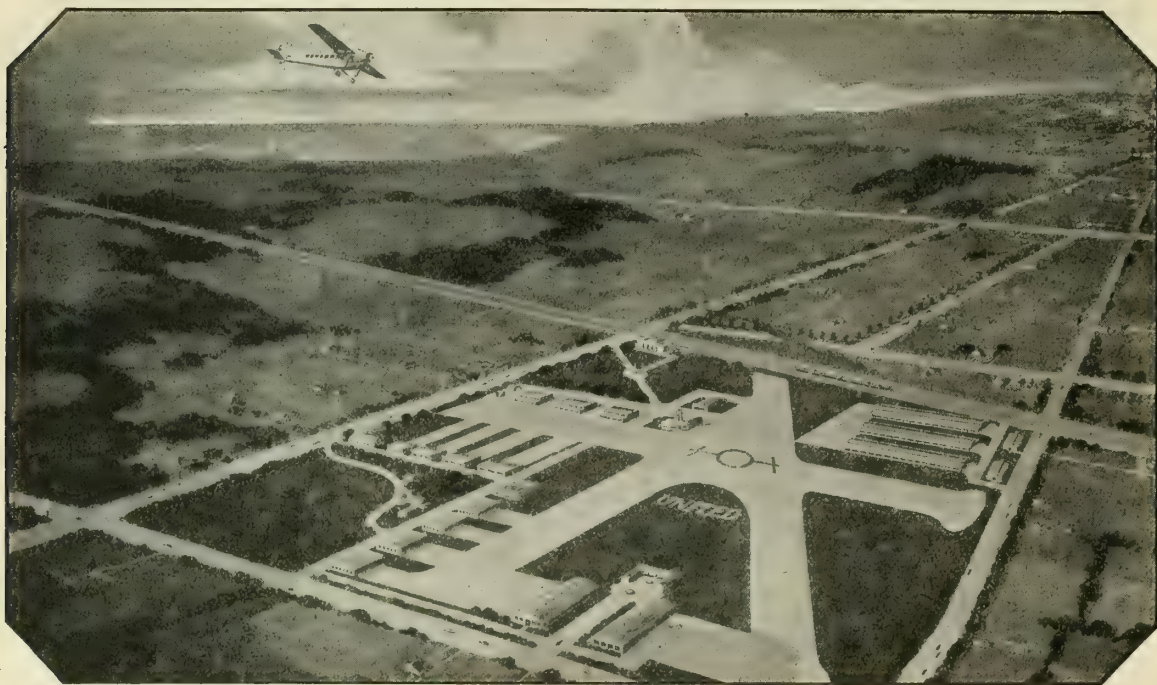
DAVID C. BEEBE, *New York*  
 JAMES L. BREESE, JR., *Chicago*  
 LA MOTTE T. COHU, *New York*  
 HOWARD COONLEY, *Boston*  
 W. W. CROCKER, *San Francisco*  
 SHERMAN M. FAIRCHILD, *New York*  
 TALBOT O. FREEMAN, *New York*  
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 WILLIAM B. STOUT, *Detroit*  
 WILLIAM E. TUCKER, *New York*  
 FENTON B. TURCK, JR., *New York*

HARVEY L. WILLIAMS, *New York*

*Information on the Corporation's capitalization, earnings, investments and operations may be had upon request to Harvey L. Williams, President, Air Investors, Incorporated, 20 Pine St., New York City*





United Airport of Boeing System at Los Angeles. Layout, design and construction by Austin.

## Airport Engineering Experience

THE United Airport of the Boeing System at Los Angeles, now under construction, is a typical example of Austin complete airport service. This organization is handling the layout, design and construction of the complete project.

Previous contracts with Boeing have included several large plant additions at Seattle, as well as hangars and airport work at various cities.

Another recent project at Los Angeles which was designed and built by Austin, is a combination factory and

hangar for Moreland Aircraft Company.

A dirigible dock for the Goodyear Zeppelin Corporation has just been completed by Austin in Massachusetts, in the record time of 30 working days.

These and other aviation projects in 40 cities from Coast to Coast indicate the breadth of this company's experience in a field where wide experience is rare.

For information on any type of airport or aviation building project, phone the nearest Austin office, wire or send the Memo.

Visit the Austin Booth at the Cleveland Show,  
No. 81-82 in the center of the Annex.

## THE AUSTIN COMPANY

Airport Engineers and Builders • Cleveland

New York Chicago Philadelphia Detroit Cincinnati Pittsburgh St. Louis Seattle  
Portland Phoenix The Austin Company of California: Los Angeles, Oakland and San Francisco  
The Austin Company of Texas: Dallas The Austin Company of Canada, Limited



Memo to The Austin Company, Cleveland—We are interested in ☐ Airport (Municipal) (Private) containing.....acres. ☐ Hangar  
.....x.....with.....ft. clearance. ☐ Factory approx.....sq. ft. Name.....  
Position.....Firm.....City.....AD 9-29



**\$350 a month**

"I feel proud of my success in Radio to date. My profit during the last two months amounts to \$700. I am making good and I have not finished my N. R. I. course yet. I am grateful for your training and co-operation to date and look forward to still bigger success when I graduate."

Clarence Heffelfinger,  
Temple, Penna.



**\$500 a month**

"When I enrolled with the N. R. I., I was a motorman on a trolley car. Now I have a fine, fast-growing Radio business. When only half way through the course started bringing in extra money. I made \$420 in my spare time. Now I have a bank account of \$2800 and about \$300 worth of stock. It has all come from Radio since graduating less than six months ago. I cannot begin to express my thanks to you and all those connected with N. R. I. for what you have done for me."

Richard Butler, 3535 Sheffield St.,  
Philadelphia, Pa.



**\$450 a month**

"In addition to my regular work in what I believe to be the largest and best equipped Radio Shop in the Southwest, I am now operating KGFI. I am proud of the fact that I installed and put KGFI on the air without help of anyone except the N. R. I. I am averaging \$450 per month."

Frank M. Jones,  
922 Guadalupe St.,  
San Angelo, Tex.



# READ what Big Money my men make in RADIO

\$350, \$450, \$500 a month. That's making real money. What business other than Radio offers such opportunities after six to twelve months training? None that I know of. More proof—last year electricians, farmers, mechanics, clerks, railroad men, bookkeepers, preachers, doctors, and men from 78 other trades and professions enrolled with me to prepare for the Radio field.

## Big Growth Making Many Big Jobs

A WONDERFUL business, you will say, to make men trained for other fields, give them up for Radio. Yes, but they had their eyes wide open. They know what you and I know—that big growth makes big jobs and many opportunities to earn big money. Heffelfinger, Jones, and Butler couldn't make anything like this money before, although they probably worked just as hard—maybe harder. Trained men are needed for the big jobs the amazing growth of Radio is creating.

## Salaries Up To \$250 a Week

WHY go along at \$25, \$30, \$35 a week when the good Radio jobs pay \$50 to \$250 a week? Cut loose from drudgery, small pay, no-future jobs. Get into a live-wire field that offers you a real chance. You don't need a high school or college education to become a Radio Expert. Many of my most successful graduates didn't finish the grades.

## Practical Experience With Course

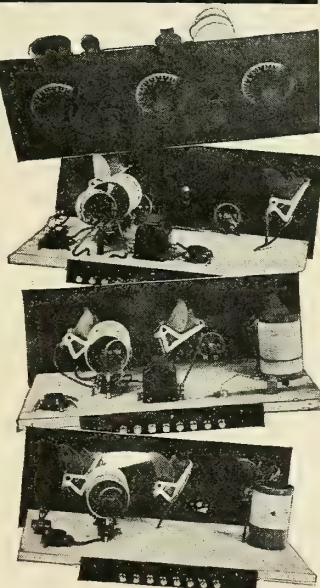
I GIVE you six big outfits of Radio parts. With them you can build and experiment with one hundred different circuits—learn the "how" and "why" of practically every type of set made. This makes learning easy, interesting, fascinating, your training complete. Nothing else equals my method.

## TELEVISION also Included

YOUR knowledge of Radio will be right up to the minute with Radio's progress and inventions when you take my training. Television, the new field for Radio experts, is included. Not one system for sending and receiving pictures by Radio, but all of them—Jenkin's, Cooley's, Bell's, Baird's, Belin's, Alexanderson's.

Television can easily and quickly become as large as the whole Radio industry is today. Broadcasting stations will soon need trained men, so will manufacturers for the designing and building of sending and receiving sets. It won't wait for you. Get ready quick.

**I GIVE YOU THE RADIO PARTS FOR A HOME EXPERIMENTAL LABORATORY**



**WITH THEM YOU CAN BUILD 100 CIRCUITS. 4 YOU BUILD ARE SHOWN HERE. MY BOOK EXPLAINS THIS PRACTICAL FASCINATING WAY OF LEARNING RADIO**

*Get a copy free*

**I Will Train You at Home in Your Spare Time**

NO NEED to leave home. Hold your job, give me one-half to one hour a day of your spare time. In six to twelve months you can be a trained Radio Expert, ready to step into a new job with a real future.

## \$10 to \$30 a Week While Learning

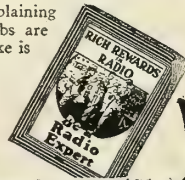
MANY of my students make \$10, \$20, \$30 a week extra while learning. I teach you to begin making money shortly after you enroll. G. W. Page, 1807 21st St., Nashville, Tenn., made \$935 in his spare time.

## Money Back If Not Satisfied

I KNOW the kind of training you need. I have put hundreds of men and young men ahead. I am so sure that I can satisfy you too that I will agree to refund your money if you are not satisfied when you complete my course.

## Find Out What Radio Offers You

MY 64-page book explaining where the big jobs are and what you can make is FREE. Mail coupon. No obligation. Address: Dept. 9W86 J. E. Smith, Pres., Nat'l Radio Institute, Washington, D. C.



## Send this Coupon

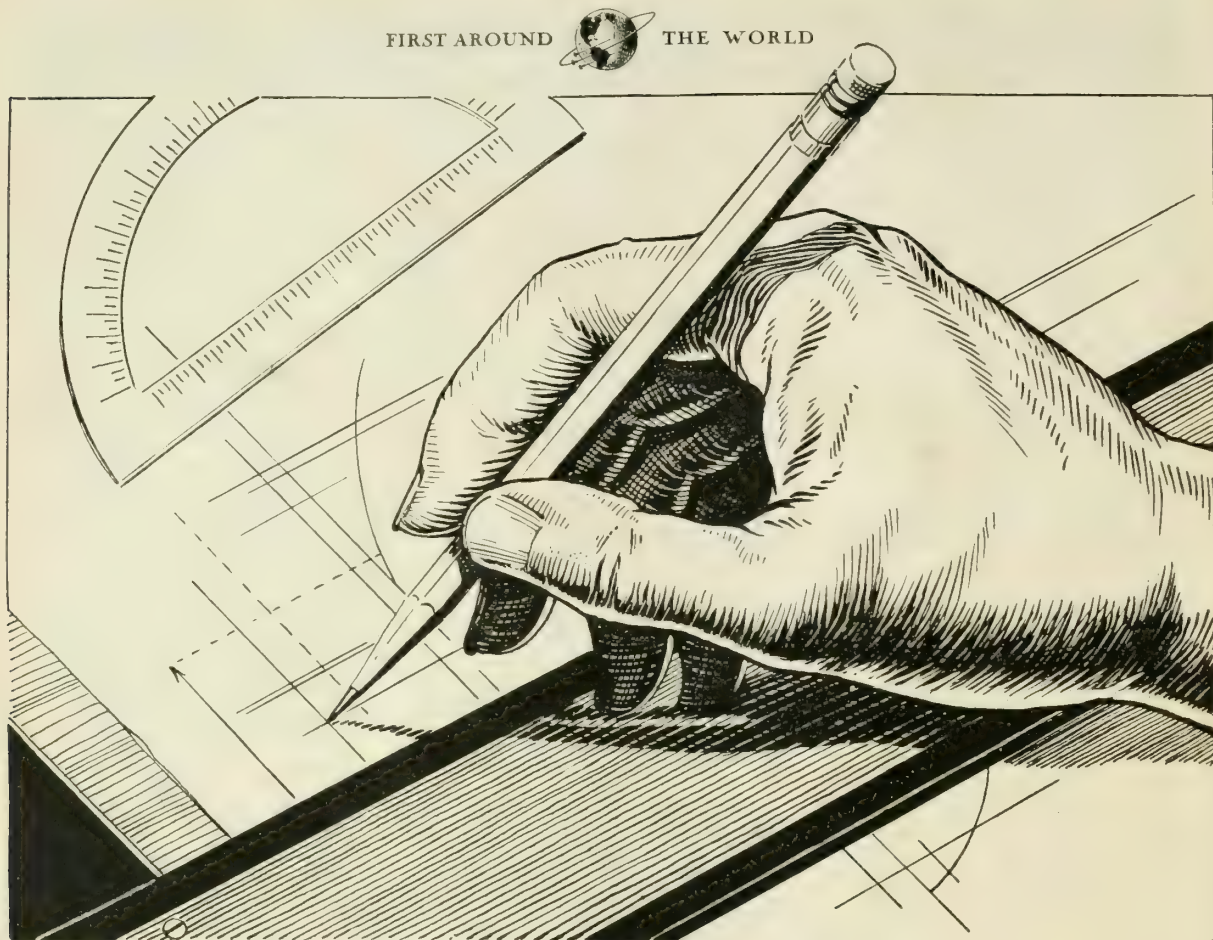
J. E. Smith, President,  
Dept. 9W86 National Radio Institute,  
Washington, D. C.

Dear Mr. Smith:—Send me your book. I want to know about the opportunities in Radio and your practical method of teaching at home with six big outfits of Radio parts. This request does not obligate me to enroll.

Name ..... Age.....  
Address .....  
City ..... State.....

**THIS IS RADIO'S BIGGEST YEAR**



FIRST AROUND  THE WORLD

### Restless Pencils!

*A NEW development, increasing the efficiency of aircraft may come from the point of a five cent pencil...in the hand of a skilled engineer!*

Research is the cradle of progress. Because the design of a landing gear...a wing fitting...or a motor mount has always been accepted as having sufficient physical strength stands as no irrefutable evidence, to the Douglas engineer that a new design redistributing stresses, in an improved manner,

cannot possess the same physical strength with the added factor of saving in weight.

Douglas engineers are constantly exploring new ideas, weighing and evaluating them with the old...ever seeking developments that will increase strength, add to performance, assure a higher degree of dependability, and contribute finally to man's sum total of knowledge applied to the conquest of the air.

*Restless pencils are adventure bound!*

DOUGLAS  
AIRCRAFT CO.  
INCORPORATED  
*Santa Monica California*



# GREAT LAKES AIRCRAFT

C O R P O R A T I O N C L E V E L A N D



## *Something brand new in Aviation*

—a two-place sport training ship with a pursuit-plane complex! Powered with an American Cirrus Mark III four-in-line air-cooled engine of 95 horse power, the Great Lakes Sport Trainer is already setting a new pace for its field.

Miles per hour faster. Far easier to handle. Takes off like a rocket and lands like a bit of thistledown. Ideally economical for the training school or the private owner who wants to go places in a hurry. And the sweetest-flying ship through all sorts of weather that you have ever felt beneath you.

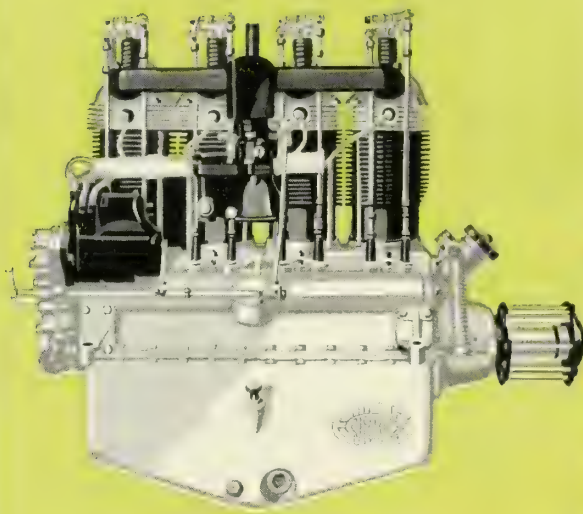
Brilliantly engineered by a corps of specialists familiar with every phase of aeronautics through years of the most practical experience.

Manufactured by straight-line production methods in one of the industry's most complete plants—by a soundly financed organization of young, aggressive men who know aviation and its requirements.

It is only natural that, with a background of such fundamental soundness, the new Great Lakes Sport Trainer should present such a remarkable combination of performance, economy, comfort, and good looks.

*Manufactured Under U. S. Department of Commerce Approved Type Certificate Number 167*





# GREAT LAKES AIRCRAFT CORPORATION CLEVELAND



*See the complete Great Lakes Aircraft exhibit at spaces A-3 and A-4 in the Cleveland Public Auditorium during the National Air Races and Exposition, August 24th to September 2nd.*

*From the rigid inspection* at each successive step in the assembly of the Great Lakes Sport Trainer to the flight test of the completed ship, quality, safety and reliable service are uppermost in the mind of every man who has to do with its construction.

The fuselage, for instance, is built up of welded chrome molybdenum seamless steel tubing, the wings of spruce and duralumin, the empennage entirely of the latter, all being fabric covered. Every piece of material that goes into the Great Lakes Sport Trainer is laboratory tested. Everything possible is provided in physical equipment, man power and experience to produce quality airplanes on a quantity basis—that is the Great Lakes policy. Yet the price of the Sport Trainer, completely equipped, is only \$3985 flyaway Cleveland. Write for complete literature.

# A GREAT AMERICAN AIRPORT

*now takes rank with CROYDON, LE BOURGET, TEMPELHOF*

2500 FEET CLEAR LANDING and take-off space in eight directions. 3600 feet in the direction of the prevailing wind. Field, grass-covered sandy-loam. Take-off strips. Natural and perfect drainage in all seasons permitting landings on any part of the field at any time.

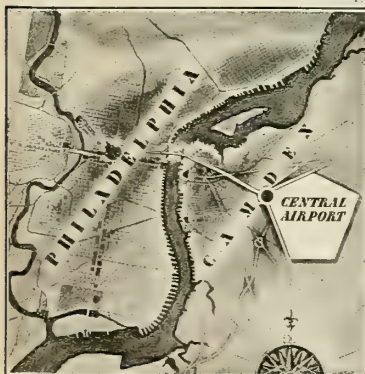
FIRE-PROOF, heated hangars, 242' x 132', with 20' overhead clearance. Macadam platforms and taxi strips.

ADMINISTRATION BUILDING containing waiting, rest and baggage check rooms, ticket offices, restaurant, dispensary, pilots' room, operations offices, radio station, weather and observation tower.

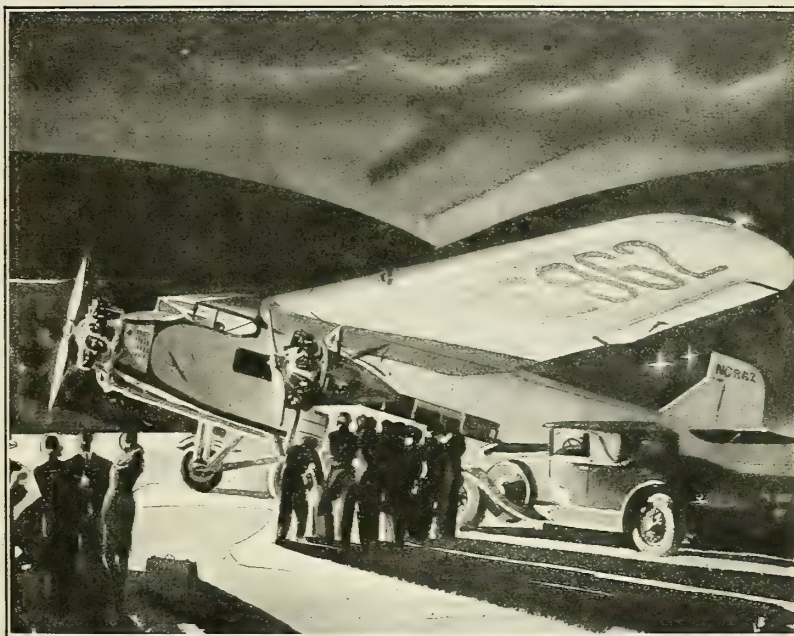
FIVE MAIN HIGHWAYS converge at Central Airport: the White Horse Pike to Atlantic City; the Marlton Pike to Spring Lake and Lakehurst; the New Jersey State Highway to New York; Kaighn Avenue to center of Camden; Crescent Boulevard to Delaware River Bridge and Philadelphia business district.

NOW OPERATING at Central Airport: the first Wright Aeronautical Service Station; Curtiss Flying Services; Ludington Flying Services; distributors for Keystone-Loening, Travel Air, Waco, Fairchild and Curtiss Aircraft.

TWO SWIMMING POOLS, one for adults, one for children, adjoining the field. Parking space for more than 4000 cars.



PHILADELPHIA-CAMDEN



THERE has been no American airport to compare with Croydon, Le Bourget and Tempelhof, for none has combined the essentials of strategic location, ready accessibility, adequate space and complete facilities. But today there is a new American airport ready and worthy to take its place among the finest in the world. It is the Central Airport, in the Philadelphia-Camden district.

Neither Croydon nor Le Bourget are so accessible. For the Delaware River Bridge and the ten-car-wide Crescent Boulevard place the Central Airport a scant fifteen minutes from the very center of Philadelphia.

Surrounding Central Airport, within a radius of a hundred miles, are the financial, political, industrial and pleasure capitals of the United States. Central Airport's location is perfect in its relation to business, commerce and the great rail and marine transportation systems.

In area Central Airport conforms in

every respect to the requirements of the Department of Commerce's highest rating. And every detail of equipment has been deliberately planned to provide the Central Airport with the most complete and modern facilities known.

Aviation men conceived Central Airport. They selected its site, financed its purchase, developed it, and now own and operate it. Central Airport is not merely for local or sectional needs. It will serve the great transport lines to the West, the South, the North.

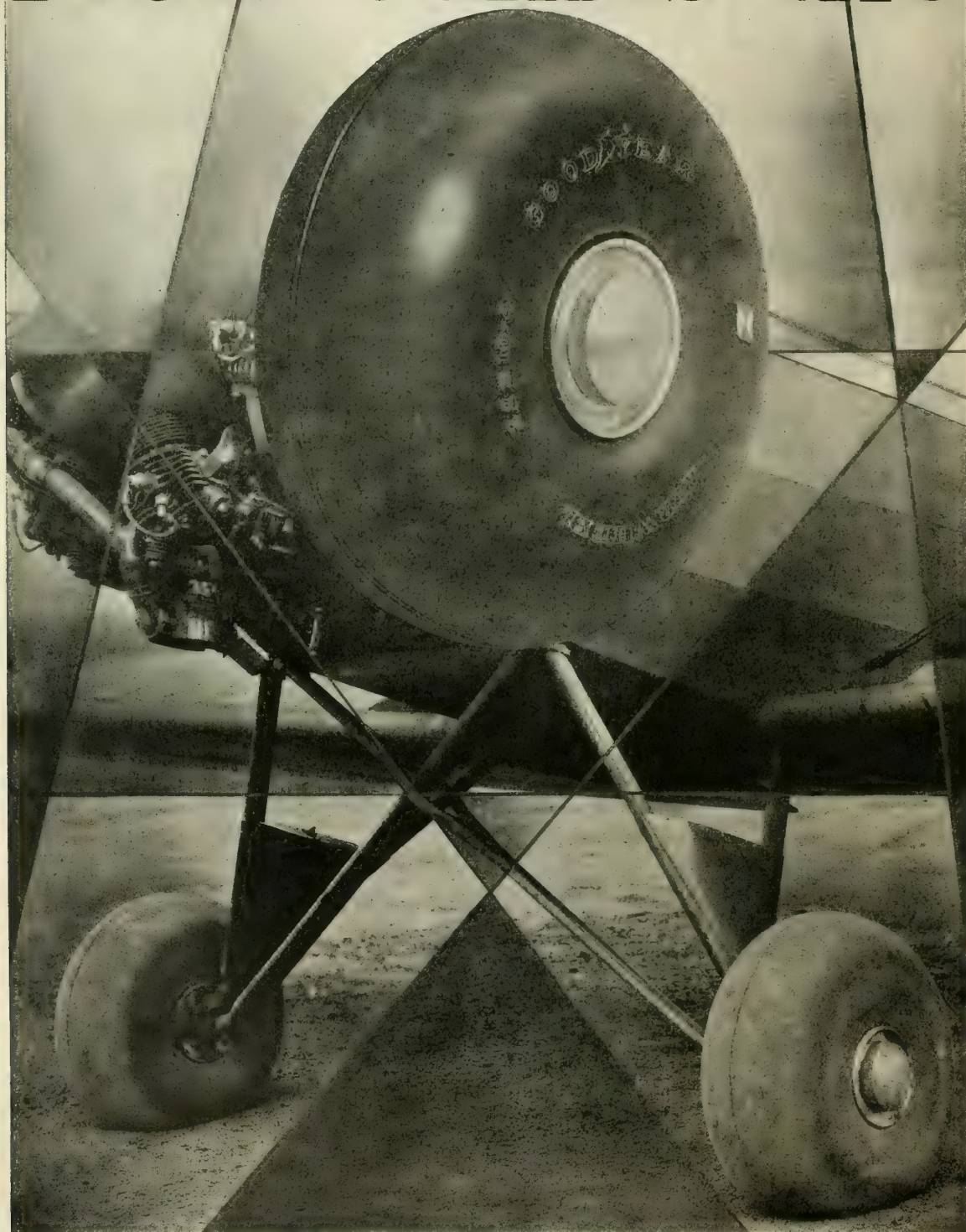
For the manufacturer and distributor of aircraft there is adjacent land for factories; space for offices and street-front showrooms; raw and manufactured materials; highly skilled, trained aviation labor; and a vast market for aircraft and flying service.

Detailed information about Central Airport will be furnished any organization requesting it. Central Airport, Inc., 538 Fidelity-Philadelphia Building, Philadelphia, Pa.

# CENTRAL AIRPORT



# Now comes the



CONSOLIDATED AIRCRAFT TRAINING PLANE EQUIPPED WITH AIRWHEELS FOR TEST PURPOSES

Say you saw it in AERO DIGEST

# AIRWHEEL

## a totally new airplane tire

Here is a big, soft, air-filled rubber cushion—a literal “wheel of air”.

It operates at pressures as low as five pounds, ranging up to twenty—and it pillows a take-off or landing as no tire has ever done before.

Since the beginning of flying, airplanes have operated on tires adapted from the automobile—an entirely different type of service. Now for the first time the airplane has a tire of its own—conceived and built for the peculiar duties of cushioning several thousand pounds of weight as it leaves or meets the ground at express train speed.

On the take-off with Airwheels there is no “hopping”. They provide continuous ground contact until the ship gets into the air.

From the first landing impact they keep the plane in gentle contact with the ground—with none of the violent rebound which an imperfect landing might otherwise cause, and with smoother, quicker brake operation resulting in shorter stops.

They land safely on snow, soft, wet

fields or sand—where former tires might have caused a crack-up.

They make it practically impossible to drag a wing in a ground loop—even if you tried to do it.

All the usual wheel failures are eliminated for the simple reason that there are no wheels. The Airwheel and its tube mount directly on the hub.

Landings have been tried with one tire deflated, and the loss of radial distance proved almost negligible.

Tests indicate that Airwheels should cause less air resistance than standard wheels used in flying—and in installed weight they are the same or less.

There is reason to believe that Airwheels will render any other shock absorber needless on ships of every type.

The New Goodyear Airwheel is available in a limited number of sizes and in limited quantities at the present time. For information or engineering assistance in equipping your future ships, write Aeronautics Department, Goodyear, Akron, Ohio, or Los Angeles, California.



*Everything in rubber for the airplane*



## THE LIFE PRESERVER OF THE AIR

(25,000 "Happy Landings")



Speed Holman\*, member of the Caterpillar Club and famous for his feats of daring in the air, expresses, below, his opinion of the part the Irvin plays in aviation.



## The IRVIN Air Chute

## Gives Added Strength to the Strongest Wings

"Many of the giant strides forward in flying progress would not have been accomplished without the aid of the Irvin Air Chute. The mechanical perfections and imperfections of all sorts of flying craft were tested to the utmost without fear of life. The increased confidence of pilots and the consequent increased skill of practical flying served to bring out more plainly than ever the strong features and weaker points to aeronautics. The past progress and present safety of aviation owe much to the fine construction of the Irvin Chute."

On more than 25,000 occasions, "live" test and emergency jumps with the Irvin Air Chute have proven infallibly successful. Adopted by all the air forces of the United States and by 28 other governments it now assures safety to flyers all over the world.

Infinite care and finest materials go into the manufacture of Irvin Air Chutes. Thorough inspection of even the smallest detail and careful packing insure the perfect functioning of the Irvin Chute whenever called upon.

Irvin Air Chutes are available in all sections of the country. Among the important distribu-

tors are Curtiss Flying Service, Inc., The National Flying Schools, Air Associates, Inc., and Nicholas-Beazley, Airplane Co. Dealers who are interested should communicate directly with the company.

If there are no dealers near you, write us and we will arrange the most convenient way to supply your needs.



\*The Caterpillar Club, organized in 1920, is confined in membership to those who have saved their lives by emergency jumps from planes in parachutes. The Club now has 232 members—All but ten of them made their jumps with Irvin Air Chutes.

**IRVING AIR CHUTE CO., Inc.**

Buffalo, N. Y., U. S. A.

Factories in Buffalo, N. Y. and London, England

The Irvin Air Chute is available in seat, lap or back types. They are all identical in construction with the exception that two grades of fine silk are used, one priced at \$290 the other at \$350. Every Irvin Chute regardless of price complies with the standard U. S. Government parachute requirements.



Our Motion Picture "Happy Landings" on standard width film illustrating actual operation of the Irvin Air Chute is available free of charge to schools, clubs and organizations interested in aviation. Send for booklet and particulars.



*See the*  
**PERFECTED CENTER WING**  
*at Cleveland*

To fully appreciate its superiority over the usual wing design you must see the "Invincible" in flight. The speed, balance and maneuverability due to the principle of the wings centering with the propeller thrust, provide sensational flying advantages.

Powered by a Curtiss Challenger 170 H.P. motor, the "Invincible" climbs the first thousand feet in fifty seconds, cruises 700 miles at 120 m.p.h. and has a top speed of 142 m.p.h. Four-place completely equipped, luxuriously appointed, \$7,800.00 at factory. Details also of the two-place Invincible Center-Wing Monoplanes upon request.

Two "Invincibles" will be at the Cleveland Airport during the Show where demonstrations will be given to interested parties.

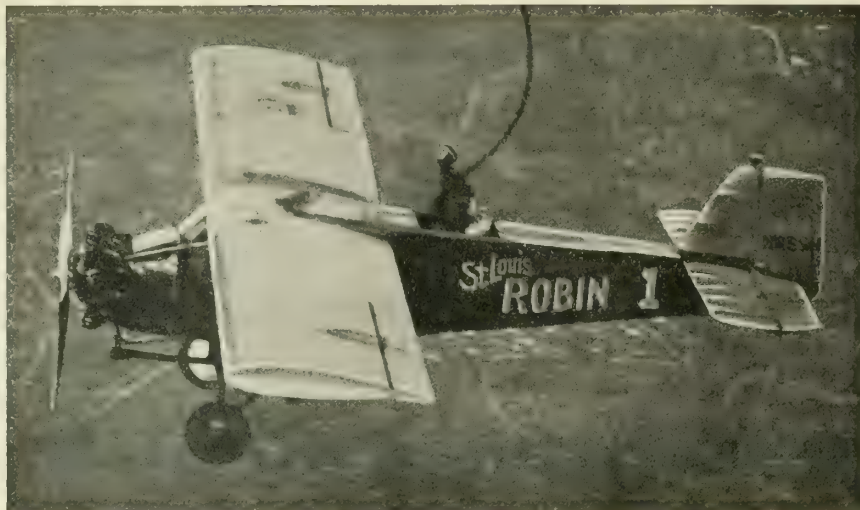


*Roomy seats anchored to the fuselage. Beautifully upholstered interior. Flying comforts that encourage air travel. Most economical for transporting a small passenger load on long or short hauls. Write for details.*

Aircraft Division  
**INVINCIBLE METAL FURNITURE CO.**  
 Manitowoc, Wisconsin







◆ A MOMENT OF REFUELING ◆

**Forrest O'Brine and Dale Jackson**  
*Flying*  
**The Curtiss-Robertson Monoplane**  
**"St. Louis-Robin"**

establish a new World's Endurance Record for sustained flight, powered with  
**Curtiss Challenger Motor**  
 Lubricated with

**GULFPRIDE OIL 120**

This is a wonderful accomplishment for the intrepid pilots, proves the excellent reliability of both plane and motor and the perfect lubrication secured with GULFPRIDE OIL.

*The Curtiss-Robertson Airplane and Manufacturing Company desired the best oil obtainable for this flight and sent us order for GULFPRIDE OIL 120. The oil was shipped to them promptly via express from our warehouse stock. . . . .*

The same grade of GULFPRIDE OIL has been used in establishing other world's records for lifting power, altitude and speed and is available to all pilots. Ask for it at airports.

GULFPRIDE OIL 75 for automobile engines is for sale at Gulf Dealers and Gulf Service Stations.

Other grades GULFPRIDE OILS for aircraft, motor boats, outboard motors and Diesel Yachts.

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PITTSBURGH, PA., U. S. A.

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# Where Performance Counts

BY

E. B. GALLAHER

Treasurer, Clover Mfg. Co.

Editor, Clover Business Service

I've had lots to say about the **reliability** and **speed** of Clover Grease-Mixed Grinding and Lapping Compounds—naturally a fellow gets all worked up about his own stuff; and it's only human nature to take what he says with a grain of salt.

But, when **outside authorities** come out and tell you the same thing—well, that's different!

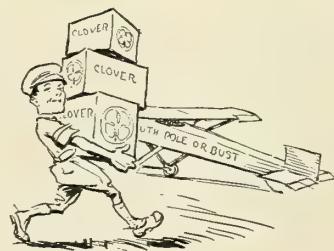


First, the new **Government Specifications** (published May 1st), based on scientific tests, stated that a grease-mixed compound not alone cuts  $3\frac{7}{10}$  times faster than all others, but was so far superior in all other properties that in the future the Government would consider nothing else—

And now comes the **Byrd Antarctic Expedition** and picks out Clover Compound to maintain its airplanes on this perilous trip—what greater tribute to **quality** and **reliability** could be given?

Naturally, like all good manufacturers, we are continually improving our product. If you haven't used Clover Compound recently, let me send you a sample.

It's great stuff.



*Gallagher*

**CLOVER MFG. CO., NORWALK, CONN., U. S. A.**

SINCE 1903

SAND PAPERS

METAL CUTTING PAPERS AND CLOTH

AUTOMOBILE NICKEL PASTE

METAL POLISHES

**CLOVER GRINDING AND LAPPING COMPOUNDS**

**E. B. GALLAHER:**

Clover Mfg. Co., Norwalk, Conn.

Send Sample

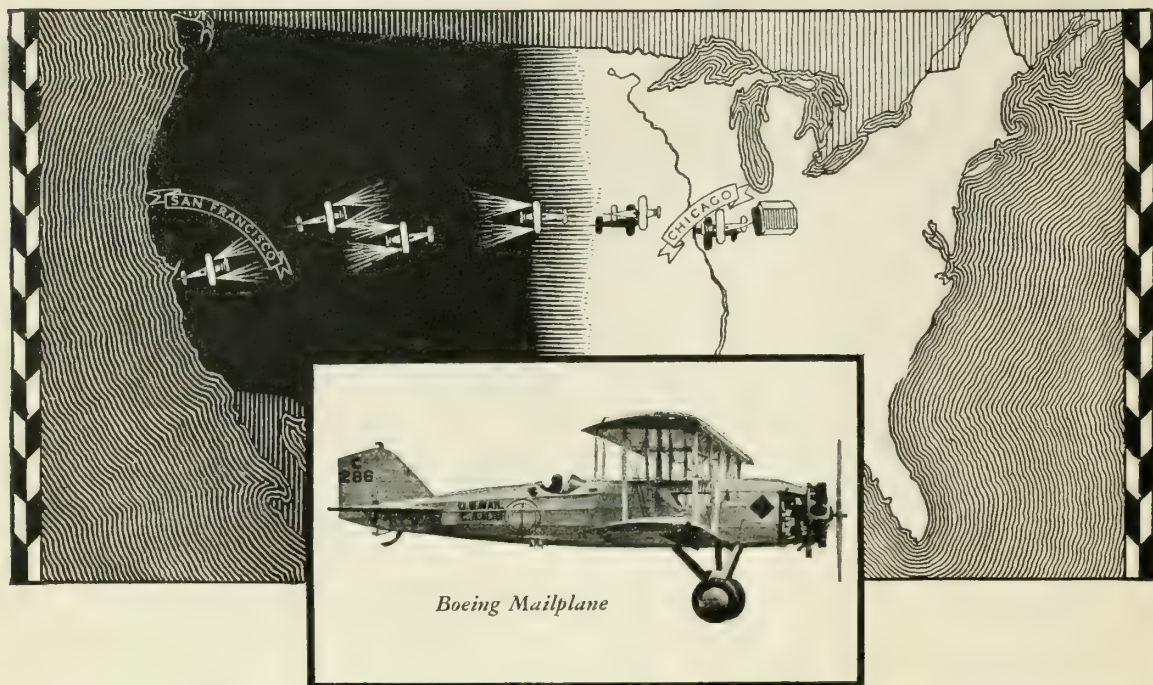
**Clover GREASE-MIXED Grinding and Lapping Compound.**

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## FROM CHICAGO TO SAN FRANCISCO *with the Boeing!*

FROM sea level to altitudes of more than 14,000 feet . . . at temperatures ranging from 135 above to 50 below zero . . . through desert heat and over snow-capped mountains, Boeing planes wing their way, every day of the year, from Chicago to San Francisco Bay.

It is significant that the Boeing designers have relied so largely upon Aluminum and its strong alloys in creating ships to meet this arduous service—to increase the lifting load per horsepower—and to insure the factor of safety.

It is significant also that the Boeing Airplane Company, operating one of the largest air-

plane factories in the United States, should turn to Aluminum Company of America as its source of supply of sheet, tubes, bars, forgings, castings, rivets, and screw machine parts, made from Aluminum and its alloys.

Technical knowledge of the application of these products to aircraft design and complete equipment for their manufacture is at the service of the aircraft industry. Inquiries are invited.

Aluminum Company of America

2484 Oliver Bldg. Pittsburgh, Pa.

Offices in 19 Principal American Cities

*These parts of the Boeing Mail Planes are fabricated from Aluminum and its alloys:*

mail pit lining  
body fairing  
fire wall between motor  
and pilot seats  
lining for bottom  
cowling  
decking  
walk ways  
channels  
ribs and beams  
longerons and struts

wing stream lining  
disc wheels  
brake shoes  
leaving and  
trailing edges  
conduit for control  
wires  
propellers  
nose section  
crank case  
diffuser section

accessory drive housing  
cylinder heads  
pistons  
gas and oil tanks  
standpipes in gas tanks  
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instrument board  
rivets  
screw machine parts  
rudder  
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stabilizers  
elevators

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also parts of  
fuselage frame  
fuselage covering  
structural shapes  
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gusset planes  
throttle handle control  
control fittings and  
strut terminals



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# UNITED STATES DEPARTMENT OF COMMERCE

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This is to certify that AIRTECH SCHOOL OF AVIATION  
 Located at AIRTECH FIELD, SAN DIEGO, CALIFORNIA is an  
 Approved TRANSPORT, LIMITED COMMERCIAL AND PRIVATE - GROUND AND FLYING School

Pursuant to the authority of Sec. 3-D of the Air Commerce Act of 1926, as amended February 28, 1929, and the School Supplement, Air Commerce Regulations, the provisions of which are made a part hereof as though written herein.

ISSUED JULY 15, 1929  
 EXPIRES JULY 15, 1930

BY DIRECTION OF THE SECRETARY.

*Clarence W. Goring*  
 Director of Aeronautics  
 for Assistant Secretary of Commerce  
 for Aeronautics.

U. S. GOVERNMENT PRINTING OFFICE 1929 11-5844



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*The S-62 AMPHIBIAN*

# 134 M. P. H. Top Speed!

## 118 M. P. H. Cruising!

If you are thinking of an Amphibian, consider the incomparable Savoia-Marchetti S-62

- Capable of high-speed while loaded to capacity
- Great lifting power
- Quick take-off
- 600 Mile range
- 500 H. P.
- Rapid transportation for passengers, mail and express
- Seats seven persons

EVERY Savoia-Marchetti, from the 3-place "S-56" Amphibian to the famous "S-55", 12 passenger, twin-hull flying boat, has the sound design, the power and the structural stamina to meet any emergency. Over twelve years of intensive engineering development, successful building and the many remarkable distance records are guarantees of safety that well merit the confidence of owner and passenger.

*Illustrated catalog, specifications, prices and franchise terms will be supplied upon request.*

*American*  
**SAVOIA MARCHETTI**



*American Aeronautical Corporation*

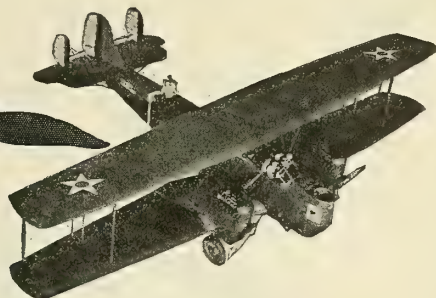
Executive Offices  
730 Fifth Avenue, New York

Factory and Airport  
Port Washington, L. I.



Administration Building, American Aeronautical Corporation's Factory, School and Seaplane Air Terminal, on Manhasset Bay at Port Washington, L. I.





# WANTED PILOTS

**Mechanics  
Repairmen  
Assemblers  
Engineers  
Builders  
Contractors  
Motor  
Experts  
Designers  
Instructors  
Salesmen**



## Let Greer Train You for a Big Future in AVIATION

Ask yourself this question: What will the aviation industry amount to in a year or so? And you know the answer—it will be America's most gigantic industry.

And question number two: Isn't it logical to assume that the men who get into aviation now will grow with the industry and be among the leaders "tomorrow?" We all know that to be so.

Even today, though aviation is still in its infancy, there is a big demand for pilots, for men in aviation factories—air transport companies—passenger and express service—air mail—barnstorming—aerial photography, motion picture work, crop dusting, etc. Opportunity! Fellows, aviation teems with it. Reason it out for yourself: thousands of passengers and tons of mail and freight are now being swiftly and safely carried all over the country daily. Manufacturers are all behind in supplying the demand for airplanes. Why? Because there are not enough men ready to step in and function in the various branches of the industry.

### GREER TRAINING LEADS TO EXPERT WORK

In the great seven and four story Greer shops you learn on actual equipment. And what training! You learn metal construction—wing building—woodworking—engine repair—acetylene welding—carburetors—ignition—complete airplane construction—rebuilding—repairing—meteorology and navigation.

Is it any wonder that students from all over the world are to be found in the Greer Shops?

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Well-known aviators—men like C. L. Laird, with many years' experience in aviation as a designer and builder, and others who have made names for themselves in aviation—are the men who will supervise your training.

Why not insure yourself for a real future in this amazing industry?

### FARE ALLOWED TO CHICAGO

When you enroll I'll allow your fare from any point in the U. S. And don't let the lack of money hold you back. We will assist you in getting employment while you are studying—and after you graduate assist you to get a still better position.

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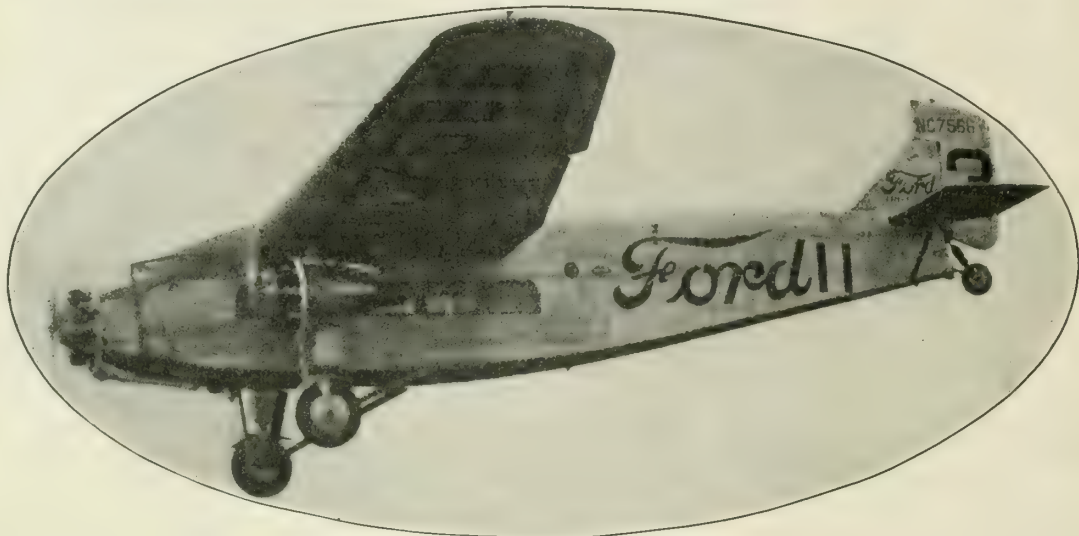
Please mail me free, your big aviation book and full details about your Training and Employment Service.

Name .....  
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Age ..... Occupation .....

# GROUND FLOOR WORK TO THE SKY'S LIMIT !



# *Lata Balsa Wood*



## Now a VITAL Factor in Reducing Sound and Vibration in Ford Tri-Motor Construction

Vibration and sound have been disturbing factors in air travel. The Ford Motor Company in its solution of these problems found by experimental tests that LATA BALSA Core Panels served to eliminate these disagreeable features to comfort and is now using LATA BALSA as a part of its standard construction.

These panels are surfaced both sides with a FIRE - PROOFED duralumin veneer. They can also be furnished in a hardwood veneer of mahogany, birch or maple.

Not only does LATA BALSA serve as the ideal insulator and isolator, but possesses unusual structural strength. It is 93% air cells, and weighs approximately seven (7) pounds per cubic foot.

Our Engineering Department has made a special study of Aviation requirements in Aircraft construction. Let us mail you the facts. Write today.

## BALSA WOOD COMPANY, Inc.

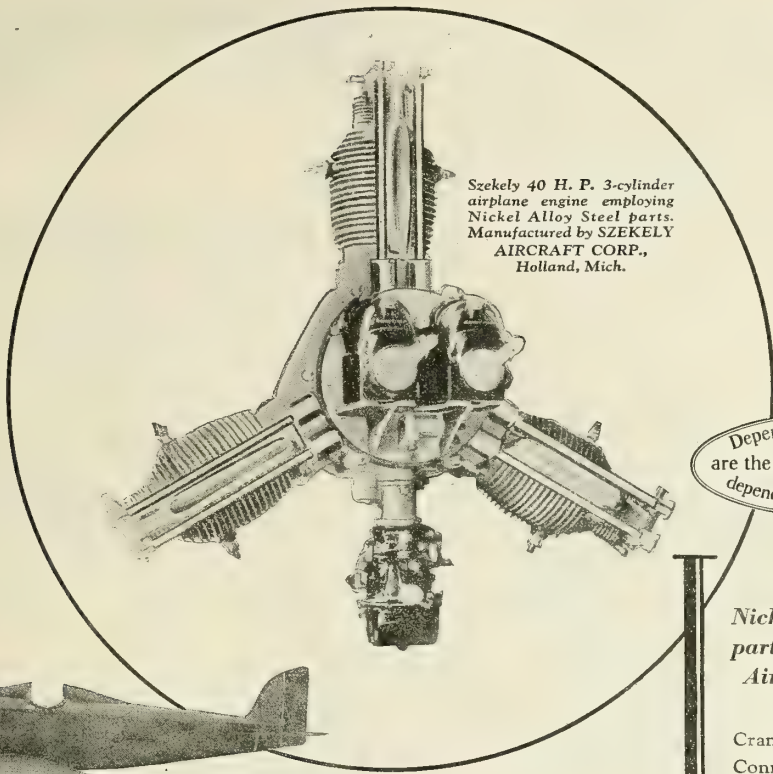
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*"The Wood of Little Weight and Many Uses"*



Szekely 40 H. P. 3-cylinder  
airplane engine employing  
Nickel Alloy Steel parts.  
Manufactured by SZEKELY  
AIRCRAFT CORP.,  
Holland, Mich.

Dependable materials  
are the best assurance of  
dependable performance

Nickel Alloy Steel  
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SPACE 94

SZEKELY...another aircraft  
engine using dependable  
Nickel Alloy Steel parts

SZEKELY radial aircooled aircraft engines have been designed to meet the increasing demand for a reliable, compact power unit for small planes. In these engines where it is particularly important that all excess weight be kept down to a minimum, dependability is insured through the use of Nickel Alloy Steel parts.

Additional important uses for Nickel Alloy Steel are found in the Flying Dutchman, a low wing monoplane produced by Szekely and powered by one of their SR-3 engines. Fittings on the Flying Dutchman are held in place by groups of Nickel Chromium Steel

bolts extending entirely through the spar, thus insuring a solid footing for the absorption of strains. Also, four Nickel Alloy Steel bolts in double shear are used for the attachment of the engine to the fuselage.

Nickel  
FOR ALLOY STEEL

The dependable uniformity of the physical properties of Nickel Alloy Steel is one of the reasons why practically all leading manufacturers of airplane engines, both in America and Europe, have adopted these alloy steels for highly stressed parts which must possess utmost dependability without excessive weight.

SEND FOR "BUYERS' GUIDE TO NICKEL ALLOY STEEL PRODUCTS"



THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.





# THE AVIATOR'S GREATEST PROTECTOR

**B**YOND his own courage and skill, what serves as the aviator's greatest protector? The answer is dependable power . . . an engine that responds perfectly to every requirement, to every emergency in the air.

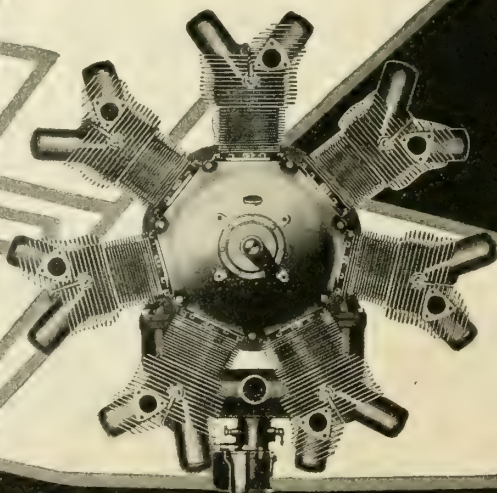
Such dependability is an integral part of Continental Red Seal Airplane Engines. This, together with lack of vibration due to proper proportion in design and balance embodies the best principles evolved during 28 years' specialized experience in designing gasoline motors, of which Continental Motors Corporation is the world's largest producer.

The result is confidence . . . confidence of the aircraft manufacturer who installs them . . . confidence of the aviator who rides the skies in a Continental-engined plane.

CONTINENTAL MOTORS CORPORATION

AERONAUTICAL DIVISION

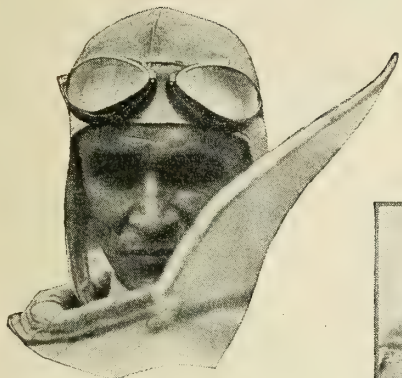
Office and Factory: Detroit, Michigan, U. S. A.



## ***Continental Engines***

# 40 Curtiss Branches

**AT THE SERVICE  
OF YOUR CUSTOMERS**

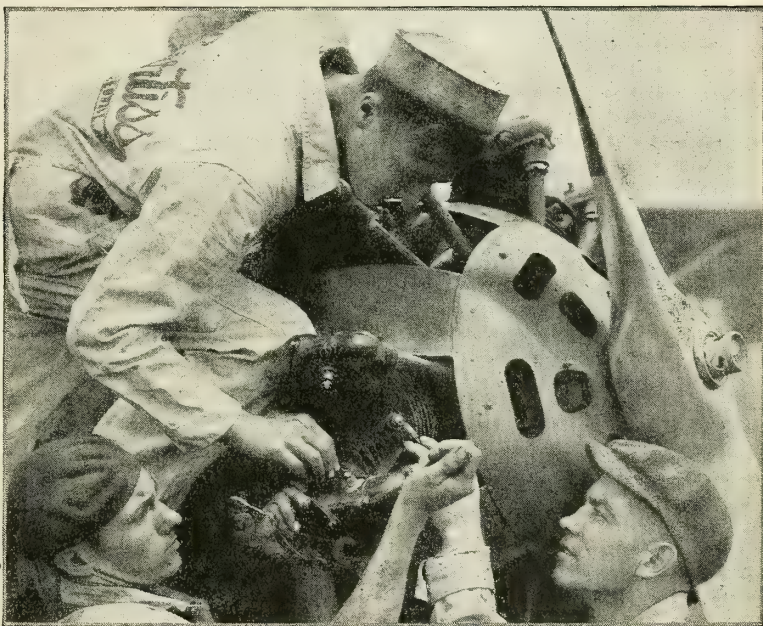


*Nation-wide Chain  
proving indispensable  
to Curtiss dealers*

**N**O matter where you are, there's a Curtiss unit within reasonable flying distance of your field. And that means a branch that's fully equipped and manned to meet any need or emergency your customers may have.

New planes—new parts—a full line of accessories—full service is waiting for them and for you—in most cases less than 3 air hours away.

And remember, there is no other company that gives you such a range of planes and motors to meet the demand of any customer. There is a plane for every use—for every purse—in the Curtiss line—and the superior quality of Curtiss



**Curtiss expert mechanics . . . carefully selected and trained men . . . a part of the nation-wide Curtiss organization that can help you and your customers.**

equipment needs no introduction to your prospects as you know well.

Naturally, this nation-wide service is a valuable sales point for you. Wherever your customer goes he will find a Curtiss branch or dealer to give prompt and complete service. His ship is never an "orphan", no matter where he takes it.

There are 85 dealers today with Curtiss and more are joining weekly. Meet the manager of the nearest Curtiss Branch now and let him tell you the full story of Curtiss dealer policy. Or full information will be given you upon request immediately. Curtiss Flying Service, Dept. 21, 27 West 57th Street, New York City.

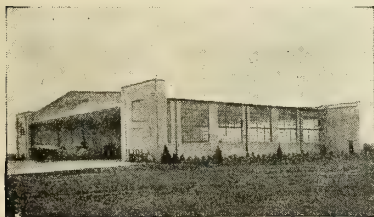
## **CURTISS FLYING SERVICE**

*Sales agent for*

Curtiss-Robertson Airplane Mfg. Co.  
Cessna Aircraft Co.  
Curtiss Aeroplane and Motor Co., Inc.  
Ireland Aircraft, Inc.  
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**The Curtiss Louisville, Kentucky, hangar . . . a modern and complete unit, one of forty Curtiss branches that gives outstanding service and accommodations.**

# **CURTISS FLYING SERVICE**

*"World's Oldest Flying Organization"*





# WORN

*by a Movie Star*

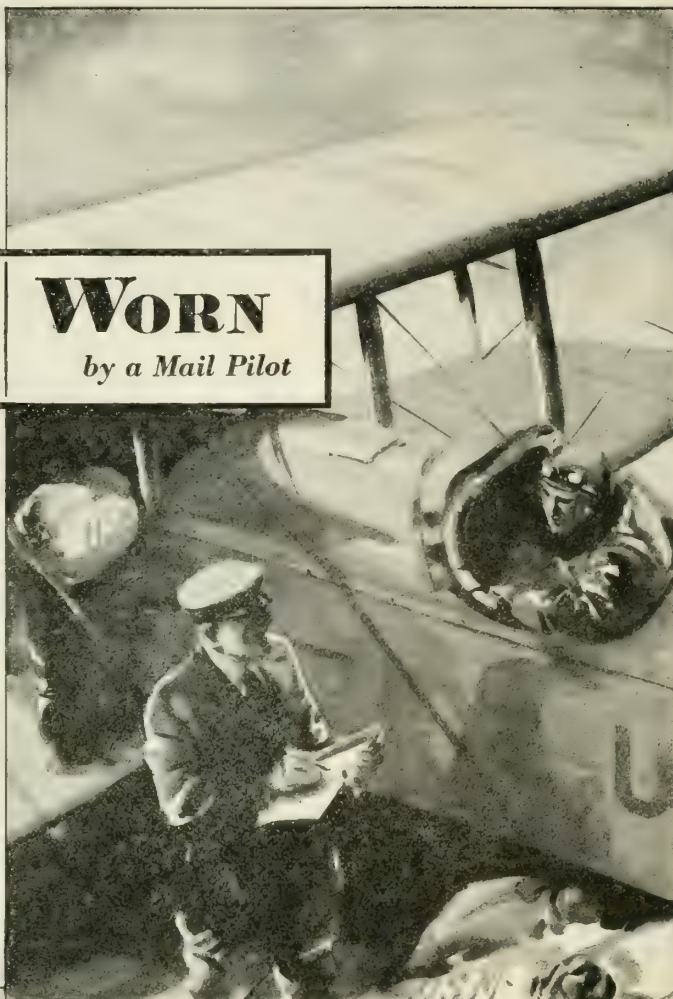
# WORN

*by a Mail Pilot*

## and for two entirely different reasons

**V**ERNON never got any further off the ground than an elevator could take him ... but the script of his new movie called for Vernon to pose *a la* pilot. So, having a keen eye for the "best-looking," Vernon naturally togged himself in a Spalding suit . . .

Rusty never had much time to pilot in front of a camera—too many of his hours having been spent hustling the mail. But Rusty knows all about the way of the wind with a pilot—and the need for flying clothes that protect, without being overly-bulky. So Rusty, too, wears a Spalding suit.



*One-piece slip-on suit. Outer shell of waterproof herringbone cloth, and lined with wool fleece. Full fur collar. Five hookless fasteners. Fifty dollars for this suit, and it'll give you several hundred dollars' worth of wear.*

Spalding suits are designed by men who've hit the "ceiling" oftener than you could shake a stick at—and who have a flair for making flying clothes that suggest 10,000 feet up. The suit illustrated here is a result of such air-mindedness.

Spalding has, of course, a complete stock of flying equipment. It is carried at all Spalding stores and at many of the leading fields. Or get the free catalog.

*A. G. Spalding & Bros.*  
AVIATION EQUIPMENT

SPALDING HAS BOOTH 114 and 115 AT THE CLEVELAND SHOW. SEE IT.

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Kinner 100 H. P.  
\$1,662.80 down and payments of \$137.19  
or \$4157 Flyaway Factory



Wright J-6 165 H. P.  
\$2,338.80 down and payments of \$192.96  
or \$5847 Flyaway Factory

## Two New Eaglerocks Approved

In visability, ruggedness, performance, ease of handling and normal control in all positions the Kinner motored EAGLEROCK is close to perfection. It is a low cowlng job and an ideal ship for student training as well as for students after training. Gliding ability approaches that of the old Long Wing EAGLEROCK. It can be used for commercial work whereas most training ships are *one purpose* planes. We believe it to be the lowest priced three-place commercial ship with radial motor on the market.

The EAGLEROCK with Wright J-6, 165 h.p. motor is popular because of its performance, smoothness and small gas consumption. Those who want flying ability and economy in the medium price class will appreciate this model.

The EAGLEROCK line of biplanes includes ships powered with motors up to 225 h.p. Within this range you may choose a plane ideal for any purpose. All may be purchased on the time payment plan.

Eaglerock biplane fuselages are finished in the following colors: Eaglerock Blue, Orange, Red or Dresden Blue. In ordering state first, second and third choice.



403 Alexander Industries Bldg.  
COLORADO SPRINGS, COLORADO

### Opportunities for Salesmen

To transport pilots, or salesmen who will hire a transport pilot, we will supply a ship at no cost and pay a liberal commission on sales—besides giving compensation for sales promotion work. It has been demonstrated that salesmen can earn from \$10,000 to \$15,000 a year under this plan. We provide a free sales training course, a list of prospects and other helps.

### Time Payment Plan

Any Eaglerock may be purchased on the liberal A. A. C. time payment plan. This provides for 40 per cent of the flyaway price down and the balance in as many as twenty equal payments. The finance charge, which includes all interest, is 10 per cent of the unpaid balance. No insurance is required.



## *The SEAPLANE is just beginning to be appreciated*

THE last two years of struggling to obtain airports near enough to metropolitan centers to make them useful have opened people's eyes to the fact that practically every important city in the country is situated beside a large body of water—the ocean, a lake or a great river. These large, convenient landing places are too inviting to be ignored any longer. And great interest is being shown in seaplanes.

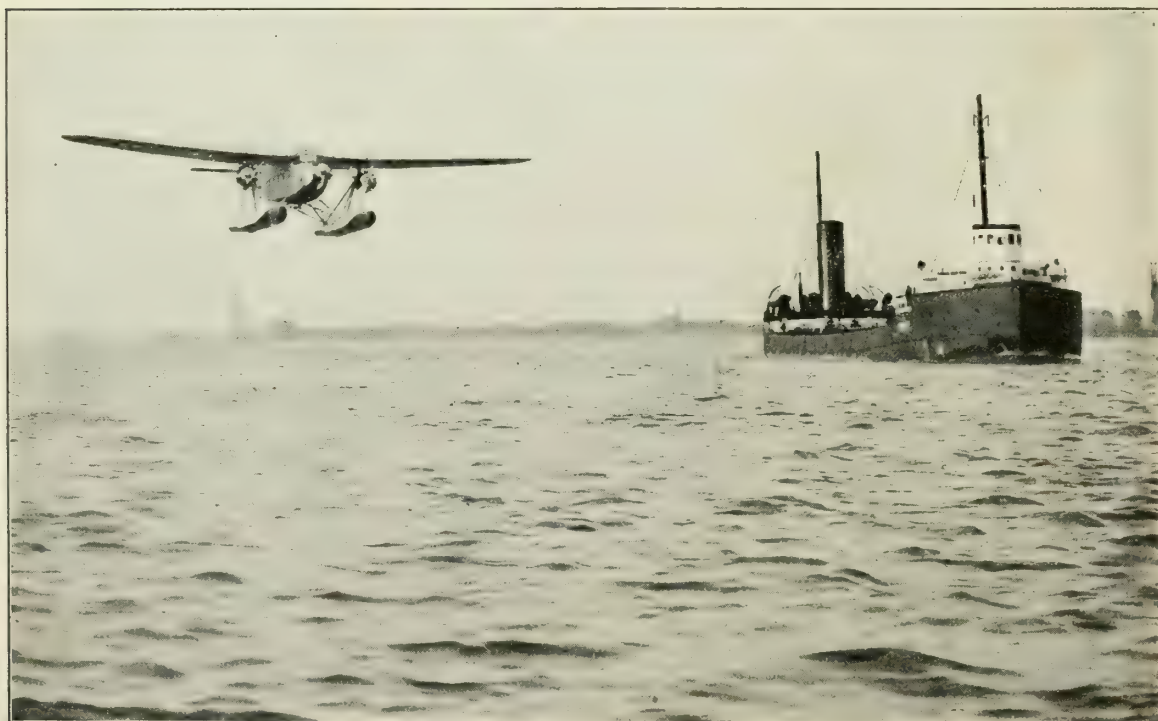
The Ford tri-motored, all-metal transport is just as suited to water as to land. With floats replacing wheels, it is immediately transformed into a seaplane, and as a seaplane it can go almost anywhere in the country. Do you remember Commander de Pinedo's flight across the United States in a seaplane?

Wherever commercial operation of transport planes is handicapped by too small an airport, or too

distant an airport, the possibilities of seaplane operation deserve considered study. The seaplane may very easily open up markets for flying services closed until now because of inadequate land facilities.

Ford tri-motored transports may be ordered either as landplanes or as seaplanes, and in either capacity they give the same reliable, trouble-free service. Salt water, so injurious to wood, fabric and glue, does not affect the non-corroding "Alclad" alloy with which the Ford plane is sheathed on all exposed surfaces. We will be glad to assist in determining the possibilities of seaplane operation on transport services where you believe it to be advantageous. Communicate direct with The Stout Metal Airplane Company, Division of Ford Motor Company, Dearborn, Michigan.

*Visitors are cordially invited to inspect the Ford Airport at Detroit*



*This Ford tri-motored seaplane was delivered to the Canadian Government for use in Central Western Canada for dusting spruce trees, in the war on the spruce worm.*

Volume 15  
No. 3

# AERO DIGEST

SEPTEMBER  
1929

THE MAGAZINE OF THE AIR

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*Army and Navy Observation and Pursuit Planes in Formation Maneuvers  
such as seen in Cleveland, Ohio, during the 1929 National Air Races*

# THE NATIONAL AIR RACES AND AERONAUTICAL EXPOSITION

Cleveland, Ohio, August 24th to September 2nd, 1929

**T**HOUSANDS of persons are bearing witness to aviation's progress during the ten days of the 1929 National Air Races and Aeronautical Exposition, held in Cleveland from August 24th to September 2nd. The colossal task delegated to Clifford Henderson, Managing Director of the meet, has finally been accomplished after months of unceasing effort, and in such a fashion as to set a new high mark in aircraft exhibition and race-meet annals. Every moment of each day has been scheduled. Not a dull moment can be found in the program of races, exhibitions, field events and entertainment features which have been provided for the visiting throngs which, by the time this issue of AERO DIGEST appears, are on hand in Cleveland to witness the spectacle. By rail, steamship and airplane have come one of the greatest crowds Cleveland has known. Attendance figures are estimated at from 300,000 to 350,000.

Three miles of floral floats, moving in pageantry over a five-mile route through Cleveland streets, inaugurate the program of events, starting shortly before noon, August 24th. Flowers comprise the medium employed to depict the advance of transportation methods since the earliest primitive forms—from the horse-drawn skids of the Indians and the chariots of the Persians to the locomotive and the automobile, culminating in the airplane. In fifteen sections, 100 floats form the procession. The rules governing prizes to be awarded the floats prohibit the use of any artificial flowers. An aerial escort of blimps and planes circle over the floral pageant as it moves through the streets.

Pyrotechnic displays are given from the plaza of the Auditorium each evening and an appropriate set-piece lights the sky, signifying the spirit of each day's successive honor designation. Each evening an aeronautical musical program extravaganza is presented in the outdoor setting provided by the background of the Cleveland Civic and Auditorium group. This presentation, its theme song and motif based on aviation, is a colorful revue with more than 100 members in the cast. It was created by Cliff Henderson, and the lighting and color effects are unusually interesting. It is modernistic, with three obelisks, surfaced with sparkling brilliants, against a background of blue and red silk drapes. The musical presentation takes place each evening at 10:30 after the exposition in the Auditorium has closed. To conclude each day, the evening entertainments in connection with the exposition conclude with the arrival of planes over the city in formation, as well as tactical night-flying maneuvers.

Cleveland's \$10,000,000 Public Auditorium, where the exposition is held, affords, with its annex, 200,000 square feet of space. Plans have been made to provide an additional 20 to 30 thousand feet of display space in case a demand for the supplementary facilities arises. The 200,000 square feet of the original layout at the Auditorium affords the industry more than 40,000 square feet more than has been available at any past aviation show.

Studded with jewels, a model trimotored airplane with a two-foot wing span, occupies a special room at the show; probably the most expensive airplane ever placed on exhibition. Diamonds and gems are embedded in the craft's

surface, representing a total value of \$400,000; the largest being a single diamond valued at \$25,000.

Several airplanes are suspended from the ceiling of the hall, in an attitude simulating flight. Planes of all types are on view. Exhibitions of parts, engines, accessories and the many contingent factors of construction and operation are also displayed. Flying schools have engaged space to illustrate their methods of teaching pilots, and air mail contractors have a special grouped section. There is a station where air mail may be posted.

Every effort was made in the designing of the decorations to express the ideals of aviation. Around the six hundred feet of balcony, silver cloth has been draped, and living green smilax draped down over it. At intervals around the balcony, windcones have been anchored with fans blowing them out over the arena floors.

Columns on the lower floor have been decorated by cut-out designs of a floodlight shining its ray up the column to a plane on top. From the central columns, smaller wing cones float out in all directions. The many chandeliers have been covered with gelatine spangles. The west wing and esplanade, because of the unfinished walls and ceilings, were treated with red saten, and around the 2,000 feet of wall space huge murals are hung, each one 20 feet wide and 7 feet high. Each consists of seven planes flying in a V formation silhouetted against a rainbow sky radiating from various skylines, such as business, residential, industrial and municipal districts. The decorations were designed and executed by the Laurence Studios, Cleveland.

The Public Auditorium is equipped with every convenience to render the best of service to the guests of the show. In addition to all the features to be found in other auditoriums, it offers such extras as a hospital, a barber shop, shower baths and numerous other features.

Out at Cleveland's municipal airport of 1,100 acres, where more than \$50,000 have been spent on the air race construction program, and \$400,000 on the city's improvement schedule, the race grandstands accommodating 30,000 persons have been built, and the white facade of the Administration building rises in the middle of the tiers of boxes in the central section.

Carl F. Egge, former General Superintendent of the United States Air Mail Service, announced plans for safe anchorage of 1,000 airplanes which were expected to come to the airport. Seven strand cable was laid in 500-foot lengths, and secured by buried anchor posts. Each 500-foot unit allows for securing ten planes. The wing tips of the planes are tied to the cable by ropes, and tail skids are tied to stakes. This uniform parking system uses 50,000 feet of cable, 25,000 feet of rope and 1,000 stakes. The plane parking area is in the northwest corner of the airport.

Twelve concession buildings, each sixty feet long and twenty feet wide, have been erected to cater to the crowds. Fourteen other buildings have been put up to house the Army, Navy and civilian contestants, visiting aviators and other race contestants. A complete hospital building has been erected.



Airplanes are marshalled on the field clear of the main runways, above which racing airplanes fly around the pylon in front of the grandstand for the closed course turns. The "paddock" of the airport, the grandstands and the boxes have been appropriately decorated. Famous trans-oceanic fliers, cross-country pilots, society women, military officers and leading figures in national and state events have made reservations.

The air race program includes some 45 major events. These are featured by nine air derbies from the extreme South, the Pacific Coast, the East Coast and Canada. Naval, Army and Marine Corps units share in the race and exhibition events. Endurance contests of all types have been planned. Gilders, blimps, homing pigeon races and efficiency contests are among the many interesting sights which are witnessed by those attending the races.

Finishes of the numerous cross-country derbies and races around the five and ten-mile courses furnish the feature of each day's program. By way of variety, there is formation flying and acrobatic maneuvering of the Army, Navy and Marine Corps units; parachute jumps singly and in groups, balloon bursting contests in which the pilots pursue toy balloons in an attempt to burst them with the tip of their propellers, ascension of military "sausage" balloons and formation flights by the Goodyear fleet of pony blimps. Added to these attractions are "dead stick" landings, and some unannounced events which can be rushed in to fill breaches on the program, should they occur.

In order to make this year's closed course races of the greatest possible interest to the spectators, the race committee has substituted the "race-horse start" for the usual method of getting racing aircraft under way. The committee's decision was made after the suggestion to start the contests in this way had been offered to them by our esteemed co-agitator, Cy Caldwell, who discovered the method and brought it to the attention of the officials. Cy has been urging, in the pages of AERO DIGEST, the adoption of this method for the past three years.

Heretofore, it has been the custom to start entrants at intervals of a minute or so, and the winner of the race was the entrant who made the best time around the course. He therefore might never lead the field, nor cross the finish line first, but still could be declared the winner. This method results in diminished interest for the spectators, who do not know who won the race until the result is announced.

By the Cy Caldwell method, contesting planes are lined up abreast of each other on the starting line in front of the grandstand, with 50 feet of space separating their wing tips. At the drop of the starter's flag, all begin their take-off run simultaneously, and once in the air head for a pylon ten miles away. During the flight to this pylon and return, called the "scattering lap," the planes stretch themselves out in a line, like soldiers on parade. When they again cross the starting lines they are abreast of each other and all start the race at once. In this way the spectators know who is ahead, and the first plane over the finish line is the winner of the event.

The races proper are over five and ten-mile courses around three or four pylons, and always in full view of the spectators. To assure safety the rules provide that no plane may cut in front of another until 300 feet ahead; that any plane passing another must keep at least 150 feet to the right of or 50 feet above the plane being overtaken; that a plane being overtaken must hold its altitude and a true course in order that it shall not interfere with a faster plane, and that a plane overtaking a slower one must never attempt to pass between that plane and a pylon. The inside or pole position is given to the first entry in the event. In

cases where there are more than nine planes entered in any event, they are divided into heats and the winners of these heats then race for the prizes.

Among the most interesting races are the Australian pursuit races for both men and women. These races are open to planes of any speed, but contesting planes are handicapped according to their speed, and the slowest one takes off first. Others follow at intervals determined by their relative speeds. According to the rules of the contest, any pilot who is overtaken must immediately drop out of the race and land. The first contestant to cross the finish line is declared the winner.

In order to make the program still more interesting, arrangements were made with several nationally known radio announcers to be present and keep up a running comment through a loud speaker system, about the personalities present and competing in the races, the various types of planes and the progress of the races, and to announce the winner of each event and of the many laps in each race. Scoreboards aid spectators in keeping track of the results.

All cross-country derbies have been timed to finish during the afternoon programs, which take place at 1 p. m. and 6 p. m. The women's cross-country race from Santa Monica, Cal., and the All-Ohio Derby end at the airport Monday afternoon, August 26th. The Miami to Cleveland Derby and the Portland to Cleveland races finish the following day; Wednesday the races from Philadelphia, Pa., Oakland, Cal., are completed; and the Rim-of Ohio Derby, and the Canadian Derby end Thursday.

Nation-wide interest has been aroused by the announcement of the Women's Air Derby from Clover Field, Santa Monica, Cal. This is the first time in the history of aviation that a cross-country race, for women only, has been attempted. It is likewise the first time that a lay organization has sponsored an event of this kind. The Santa Monica Exchange Club, which sponsored the race and donated \$4,000 toward the first prize, is lending its services solely through a desire to aid the progress of aviation.

In order to give the control cities along the route an opportunity to see what the contestants look like and to watch the progress of the race, the long flight is made by easy stages. The route is from Santa Monica through California, New Mexico, Arizona, Texas, Oklahoma, Kansas, Missouri, Ohio and thence to Cleveland. The complete purse involved in this race is one of the richest in the history of aviation. Eight thousand dollars in prize money awaits the contestants at the conclusion of the race, in addition to the first award of the Aerol Trophy, donated by the Cleveland Pneumatic Tool Company, and estimated to exceed \$2,500 in value. The winner, however, must defend the Aerol Trophy every year, in races among the lady members of the N. A. A. The winner of the women's Derby, however, retains permanent possession of a handsome desk plaque, a miniature reproduction of the Aerol Trophy.

The woman who wins this long-distance event must be a pilot. The contest committee withdrew every chance of an experienced male pilot being taken along ostensibly as a mechanic, or of an accompanying plane acting as guide and relieving the contestant from the necessity of navigation. The rules specify that no airplane precede the entrants by less than 30 minutes, and that no airplane be allowed to fly alongside, or immediately in the rear of any entry. A passenger or mechanic may be carried, but must be a woman; furthermore, one who has never had a solo flight. No male is allowed to ride in any of the ships in this race. Each entrant must have a Department of Commerce License, F. A. I. license and an annual sporting

(Continued on page 120)

# FLYING IN THE LAND OF THE INCAS

By Lieut. G. R. Johnson

With illustrations by the Author

**T**HE history of aviation in the Republic of Peru, though comparatively short, fully atones for its relatively brief duration by the vigorous manner in which flying, both from the military and commercial point of view, has progressed. Dating from the year 1921, when Juan Leguia founded and organized the naval base of Ancón, until the present time, when military and naval and civil aircraft traverse the airways of the republic to all points of the compass, aviation statistics amply demonstrate the manner in which those responsible for the development of the aerial services have labored to achieve their goal. To this group of officials and civil pioneers is due all the credit of the mastery of the air in Peru today, and, aviation in the Republic will not forget them and their magnificent efforts in the years to come.

With the establishment of Ancón in 1921, and with the ingress of many pupils and embryo pilots, Juan Leguia turned his attention to the establishment of a military flying base at Las Palmas, leaving Ancón in charge of another official. In the subsequent three years, however, the naval flying school, for some inexplicable reason, suffered a serious deterioration, and it was not until the advent of Commander H. B. Grow, in 1924, that Ancón, in response to his efforts, came into its own again.

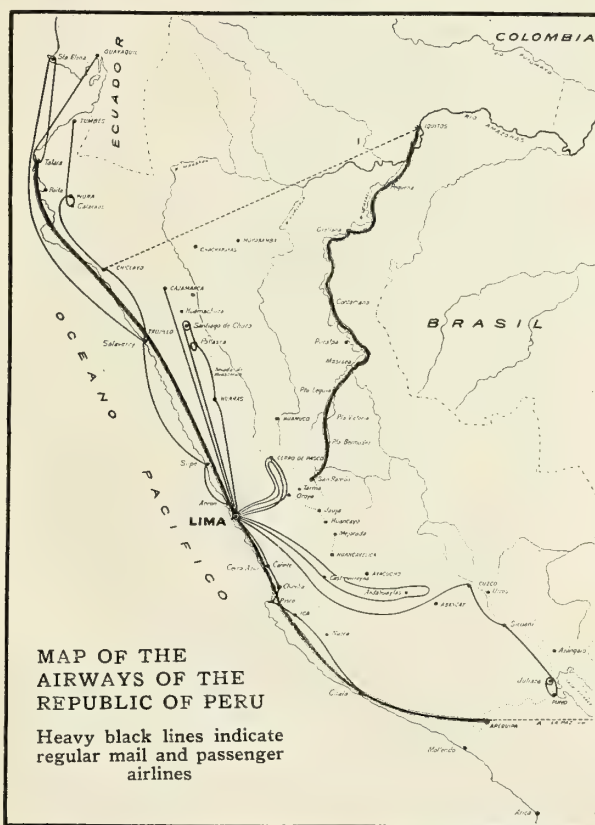
Commander Grow was a member of the United States Naval Mission which visited Peru in 1924, and, when the remainder of the officials returned to the

States, he remained behind to rebuild and reorganize Ancón. The aviation base at that time possessed but one plane and a few men.

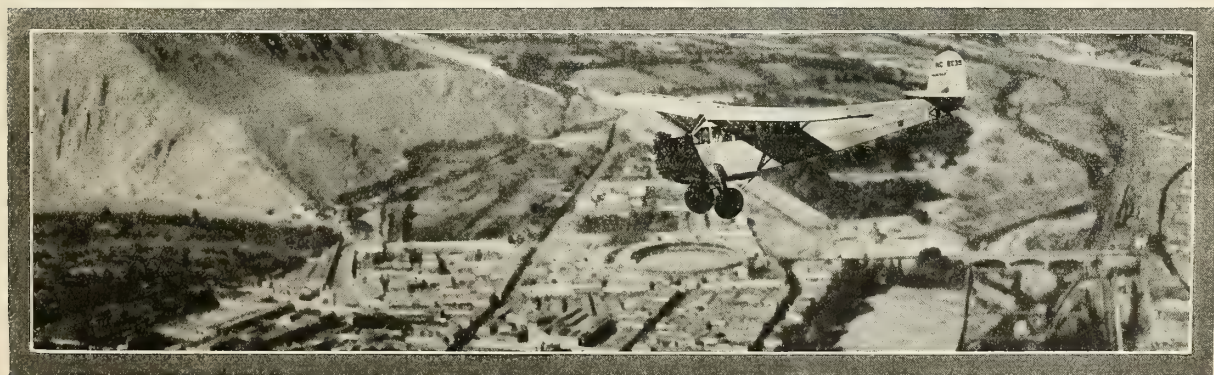
The first step was to rebuild and redevelop Ancón entirely, and the years 1924 and 1925 were both spent in this work. In the meantime, three Boeing training planes of the type then used in the United States Navy had been ordered, and three ensigns, all graduates of U. S. Naval Academy, were taken as students. The flying school was officially opened on August 25th, 1925.



Lieut. G. R. Johnson, Chief Photographer of the Peruvian Naval Air Force



Concurrently with the opening of the Ancón flying school a Reserve Corps of naval aviation was established. This institution was urgently needed, inasmuch as the capacity of the naval academy could not contend with the demands of the increasing air fleet and at the same time provide pilots for commercial aviation. In the same month in which the flying school opened in Ancón, the first six students were taken into the Reserve Corps. From 1925 to the present day, Ancón has continued to expand and improve in a phenomenal manner. Today there are a considerable number of qualified pilots included in the school, with more in training. The



Fairchild cabin monoplane flying over Lima, Peru. The famous Peruvian bullring may be seen below the plane



base is furnished with a fine residence for the commanding officer, a students' house, an officers' club, administrative buildings, extensive barracks for petty officers and men, well organized machine and carpenters' shops, radio, gunnery and photographic departments, and cement runways and hangar space for twenty-four machines. The flying base also has its own electric light and power, water and sewage system, football field, etc., all having been organized and designed in accordance with similar air stations in the United States. The equipment at present consists of modern planes of types used in the United States air services.

In the spring of 1926, when the Ancón school was well under way and several pilots had completed their course of training, permission was obtained from the President of the Republic to organize, if possible, an aerial service between Iquitos, on the Amazon River, and some southerly point in communication with the Central Railway and the coast. The necessary permission having been obtained, Commander Grow set out in September, 1926, to explore the region in question, returning in the following December, after having selected sites for air stations and landing fields.

The necessary equipment and materiel for the proposed inland air service was purchased in the United States. The necessary funds having been provided by the government, work was commenced on air stations at San Ramon, in the beautiful Chanchamayo Valley, at Masisea, on the Ucayali River, and at Iquitos.

In the following October, two new landplanes having arrived in Lima, Commander

Grow and Lieutenant Alvarino set out in them on a tentative flight across the high Andes to San Ramon. The difficulties presented by a journey of this character are amply demonstrated by the fact that only after four unsuccessful attempts to cross the Cordillera was the objective finally attained.

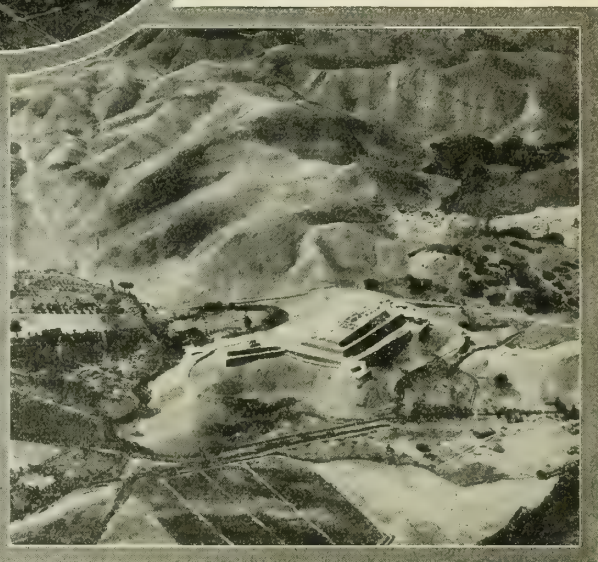
The entire month of November was spent in exploration flights between Masisea and San Ramon, and it was not until the following month that the group of pilots and mechanics arrived in Iquitos to establish the seaplane base.

On November 18th, 1927, a significant and epoch-making date for the people of the Eastern Rivers—the first mail and passengers were flown from San Ramon to Masisea, Colonel Lembke, new chief of the Iquitos Zone, having been the first passenger.

The second flight, during which mails and passengers were carried, took place on December 5th, when two landplanes reached Masisea after a highly successful trip across the eastern mountains and jungle. The remainder of the month of December was occupied in setting up and testing seaplanes in Iquitos.

On January 3rd, Commander Grow returned from Iquitos to San Ramon, covering the entire 700 miles of the journey by seaplane and landplane in record time. Since that first through flight in January, the San Ramon-Masisea-Iquitos aerial mail and passenger service has continued to function in accordance with schedule in a most satisfactory manner.

The pilots are to be highly commended upon the efficient and capable manner in which they are complying with the strenuous exigencies of their



Center above: Lima, the principal city of Peru, as it appears from 11,500 feet. Lower left: New Samanco. Lower right: An old Inca fortress which was built at the time of the Spanish conquest when the Inca tribes were nearly exterminated.





A typical Peruvian town on the coast



El Misti crater from 20,000 feet

tasks. Only those who know the nature of the extensive territory covered by the Eastern Air Line can fully appreciate the immense and seemingly invincible difficulties which confronted the pioneers of the service upon their arrival in the region to establish the aerial route, but even the stranger, by making a study of the map, and noting the extant hazards of trackless mountain and jungle wilderness and winding river-maze, all of which have been conquered, will be able to appreciate to a certain extent just what the fliers have had to contend with and are contending with at the present moment.

The same work which was carried out in Ancón is now under way at Las Palmas. A cement road was constructed to furnish good automobile and foot-traffic facilities between the school and Barranco; the size of the flying field has been considerably increased; new hangars and barracks for men and officers have been constructed; and a well-equipped radio station has been established.

Among the many improvements at Las Palmas should be mentioned the establishment of a mechanics' school. The mechanics are at present all civilians, but it is proposed, in the near future to militarize the entire camp, in order to maintain better discipline.

On September 2nd, 1928, President Leguia officially opened the new Las Palmas road, inspected the entire school, and was made acquainted with all improvements.

It is hoped to acquire and maintain the most modern training equipment for Las Palmas, so that the training of military flying students can be carried out in the same manner and on the same scale as is at present the case at



Ancón, the Peruvian naval air station and training center

the naval air station at Ancón.

Plans are to open up air communication between the Puno region and Maldonado, in the Madre de Dios zone, in the same manner as the San Ramon-Iquitos airline was established. The ground journey between these two points takes 12 to 14 days, and is full of hardships and difficulties. The distance between Puno and Maldonado can be covered by plane in 2½ hours. It is also proposed to connect Puno with Mollendo by the establishment of a competent air service. A third project is, once the necessary materiel is available, to organize a system of army airways throughout the country, a scheme which will indubitably lead to the further rapid progress and prosperity of the whole Republic.

Once the proposed Yurimaguas Railway, in the north, is well under way, a further air service will probably be established between Iquitos and Chiclayo on the coast.

Commercial aviation in Peru is at present carried out by two civil organizations, the Faucett Aviation Company, running a regular weekly service, with Stinson-Detroit 5-passenger cabin monoplanes, between Lima and Arequipa, in the south, and Lima and Talara, in the north, and Huff-Daland, Inc., running a similar weekly service, with one Fairchild 5-passenger cabin monoplane, between Lima and Talara and Trujillo.

Both these services carry passengers and mails, and are running to full capacity. It is known that Peruvian Airways, Inc., will soon run as far north as Panama, connecting at that point with the New York airline. When this through service is established, passengers and mails from Lima and southern Peruvian centers will be flown direct to

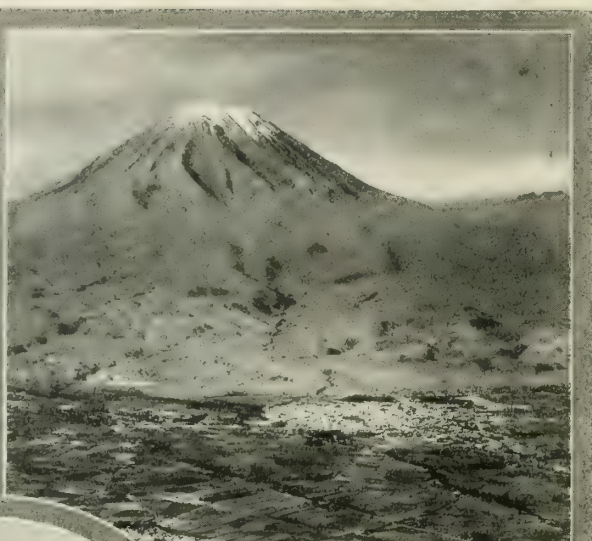




Along the San Ramon-Iquitos airway

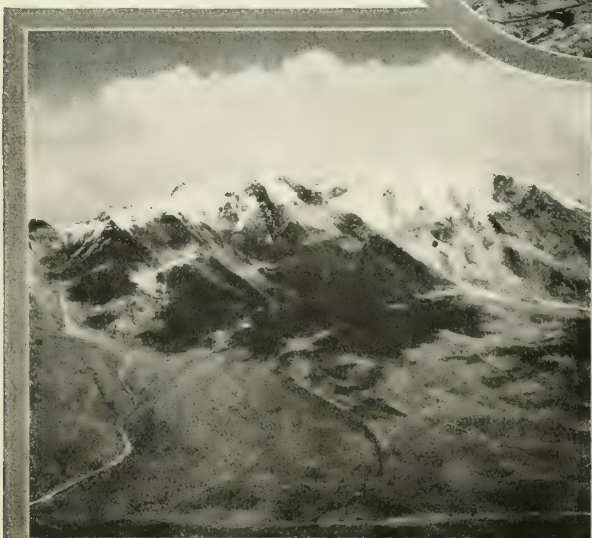
New York in the course of a few days, the extra expense being fully compensated for by the short duration of the journey as compared with present steamship transport.

In April, 1928, a law was passed to control commercial aviation, which obliged all civil pilots to pass the same tests as the army and navy fliers, thus providing a wide margin of safety for passengers taking advantage of the commercial companies' operations and for periodical inspection of all commercial planes to keep them in condition.



El Misti, with Arequipa at its base

The government has instituted a decoration called the Cruz de Aviacion del Peru, which may be awarded to army, naval and civilian pilots for acts of signal heroism in carrying out their duties, for special flights contributing to the progress and advancement of aviation in the Republic, and also for any record-making flight achieved by any aviator from outside points to Peru, and for any like flight made by pilots in Peru to distant countries and capitals. The Aviation Cross of Peru  
(Continued on page 352)



Center: the Andes northeast of Arequipa, in the southernmost region of the Republic of Peru. Lower left: Andes coastal range about 500 miles south of Lima; right: the town of Mollendo, where a landing field for mail planes is located



# THE WHEREFORE OF WAR

## PART III—THE TIGHTENING NOOSE OF COMMERCIAL AND AERIAL CONTACT

By

James Warner Bellah

IT is doubtful whether the man in the street sees the threshold the world is about to step over. Outside of the loyal little group which for a quarter of a century has been called crazy because it saw today through the haze of distance, our air-mindedness in America is barely three years old. And yet in those three years, aerial transportation has developed so swiftly and so surely that already we are in the "yacht phase." If you will think back to Columbus for a moment and consider how long a time elapsed between his arduous crossing and the day the first pleasure yacht was launched under the flag of a layman, you will see how significant the yacht phase of flying is. It means casual acceptance, security and safety. It means that, in another ten years, aerial transportation will have advanced farther within its limitations than ocean travel has advanced in the last two centuries. A question for our immediate consideration is to what an extent the universal air travel which the next decade will see, will either enhance the dissemination of patriotic propaganda or break down national barriers of prejudice. Will a week-end business trip from New York to Paris, with a few hours to see a man in London, make us any less American in sympathies, more international in loyalty? Will a flour salesman leaving Chicago on Wednesday to sell a Nicaraguan on Friday, a Dutchman in Curaçoa on Saturday, a Peruvian in Lima on Monday, love Chicago the less when he returns the following Thursday? Will a British surgeon from Singapore called from his bed to a conference in Tokio return in seventy-two hours to his bed with any great love in his heart for the infernal clack-clack of *geta* and the universal expectoration of the Japanese? I think not. For with the increased aerial contact of nations, we overlook the fact that by its very nature it will be but a fleeting contact at best, here today and a continent away by this time tomorrow.

A decade will prove or disprove the old theory that understanding leads to friendship, but it will do something more, and far more important to this discussion. It will speed to an unbelievable pace the workaday game played by the political teams of mankind and the ancient game of barter and exchange, by individual man with individual man. In times gone it was as simple a game as Slap-Jack. What one man dug up, grew or made he swapped for something another man dug up, grew or made; and there the transaction ended. In those days, it occurred to certain brawny gentlemen that ultimate happiness and ultimate leisure for the more pleasant pastimes of wine, women and song lay in dispensing with the simple rules that called for the initial process of digging, growing or making and substituting for them a certain skill with a large club, by the exercise of which on certain craniums, or by the threat of the presence of which, they could gather unto themselves the products of the digging, growing and making of others without bending their backs to anything more strenuous than a two-handed swing or soiling their hands with anything more noisome than a gob of steaming brain.

From this spark of economic genius on the part of the Robber Barons of yore sprang the flame of man's belief, nourished up to and through the past century, that a successful war was a most profitable commercial undertaking.

It resulted in the acquisition of land (the basis of wealth), captives who worked henceforth for no wage, and plunder. And all it cost was a delightful Roman holiday for a group of professional soldiers who enjoyed nothing else.

And the belief was sound. To its crystallization we owe the fact of our own country's territorial existence today. Right or wrong, we own the land from Maine to California by virtue of past force of American arms, and only a fool can deny that we are making more out of it than the Indians did, more than the Mexicans could have made in the Southwest, and, by virtue of our political unity today, more than a combination of Spain, France, Holland and England could have made in four separate units, had the country matured in four units from Colonial times to today.

Therefore wars were profitable at one time, if gain is the goal of man's endeavor.

And on the same basis, some successful wars always will be profitable just as a successful bank hold-up will be profitable as long as the hold-up men get away and remain unapprehended. The equation is simple. If you can get something by force that is worth more than the expenditure you are compelled to make in exercising that force—and you get it—your books must inevitably show a profit.

War, however, as a business enterprise, per se, has passed from the face of the globe and will never return in our present mechanical civilization. But war as a safeguard against the discontinuance of the vital flow of commerce will never pass until that civilization itself passes.

It is deemed a natural national expedient to use force of arms to keep the wheels of commerce rolling. Call such a belief defensive or offensive—it makes no difference. It is war. The needs of commerce, then, are and always will be at times a cause for war. For so complex has commerce become in this day and age that to stop it abruptly means famine, plague and death with overwhelming abruptness. Man is so inexorably interlocked with his fellow men that humanity has become an intricate machine functioning solely by the flow of commerce. Stop that flow and we would all have to rush out into the country and plant gardens in order to fill our stomachs.

It is conceivable that offensive wars will always be justified when the commerce of any nation is so curtailed by the commerce of another as to threaten the economic—subtending, as it does today, the actual physical health of the curtailed nation. We use the word justified not in a moral sense, but in the strictly animal one of self-preservation. Such a war, offensive in its mechanics and manifestations, becomes essentially defensive in motive. Therein, I believe, lies the German claim of innocence in 1914 and the indictment of France and England and Russia.

If war itself is not profitable, at least it can be said to break things up to such an extent as to necessitate a new deal and a new chance for all.

With a vast, inevitable and universal aerial contact bearing down upon us with lightning speed, the next ten years will see, through increased facility of market communication, the meshes of commerce drawn more tightly than ever before. It will no longer be the Slap-Jack of yesterday nor the Contract Bridge of today. It will be a game of championship Chess. Chances (Continued on page 358)



# THE FLIGHT of WILLIAMS and YANCEY

By Charles J. V. Murphy

*As Related in an Exclusive*

*Interview Arranged*

by AERO DIGEST

OF the many weird adventures recounted by trans-Atlantic fliers—tales of fog that tortured the eyes and wearied the mind, tail spins in the black of night, and utter exhaustion—Roger Q. Williams and Lewis A. Yancey, who most recently flew across the Atlantic, from Old Orchard, Me., to Santander, Spain, and from there non-stop to Rome, have brought back the strangest story of all. Said these young men:

"We didn't have a single tail spin."

Said Yancey: "It was infernally dull."

Said Williams: "The quality of the Atlantic, like the quality of mercy, should not be strained. The air has been worse over Staten Island."

I asked Messrs. Williams and Yancey: "Then you aren't super-men at all?"

The two of them lifted their hands and chorused: "Hell, no!"

It came about in this fashion. Williams and Yancey had their Bellanca Monoplane, *Pathfinder*, at Old Orchard, waiting for take-off weather. At 4:39 p. m., they received this telegram from that excellent gentleman, Dr. James A. Kimball, forecaster for fliers:

"Thunderstorms approaching from west. Will spread from Maine to Nova Scotia Monday, but preceded by freshening southwest winds. Start should be made be-

fore storm conditions reach Old Orchard. Much fog east to longitude 45. Less and thinner to south-east. Light but freshening winds mostly southwest of Longitude 35, then fresh west to southwest longitude 15, then fresh west to northwest to coast."

Williams looked at the telegram and their weather map: "That's good," he said.

Yancey yelled. "Good? It's perfect."

They phoned the hangar on the beach, announced they were going in the morning. Benny Bauer, the Wright man, puttered around the Wright J-5, more out of love than need, for it was as sweet as an engine could be. The mechanics, Zabora and McCormick, went over the ship a last time. Harold Beadle, the Tidewater Oil expert, began ladling in 500 gallons of fuel. And Williams and Yancey went to bed.

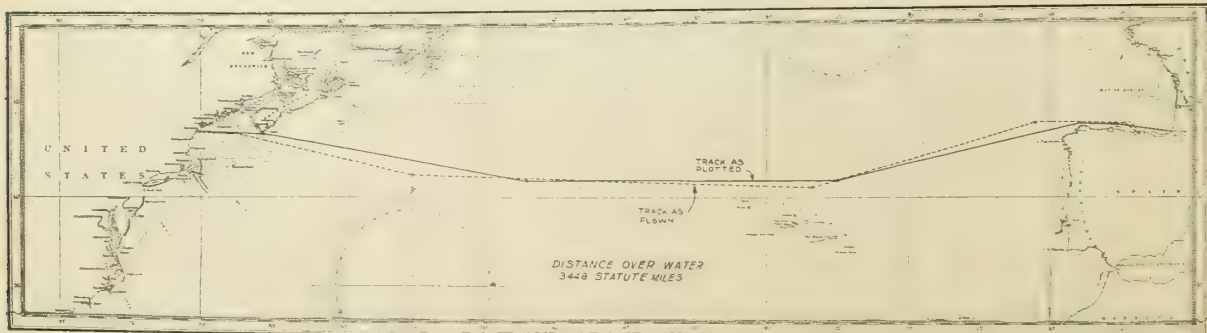
They rose at 6:30, went down to the beach, noted with gladness that the tide was retreating, and the beach would soon be hard and firm. And the prospect of tail winds pleased them so mightily they de-

cided to jettison 65 gallons of gas, to reduce the take-off load by nearly 400 pounds. It would be easier to get off.

At 8:30 o'clock, Lieutenant Melko of the Coast Guard took off in an amphibion. Ten minutes later he dropped a note. "Visibility one-half a mile. Air good. Come



Portrait of Roger Q. Williams and Lewis A. Yancey made by Mussolini's special photographer



Reproduction of the map used by Williams and Yancey, showing the course as plotted and flown



on!" A light fog hung over the beach.

At 8:49, Williams and Yancey crawled into their ship, and took off. Williams was at the controls, and Yancey sat at his right.

\* \* \*

It is unexpectedly easy, the take-off. The Belanca lifts clear its load of 5,800 pounds in 3,000 feet. It climbs to 300 feet. Not caring to enter fog at that altitude, they circle in a cleared space until they reach 600 feet. Then Williams settles back in his chair—he has wisely equipped himself with a cushion—and heads for the compass course Yancey has set for Cap Sable.

The Coast Guard amphibion is tagging right along off the starboard; a flying boat carrying visitors from New York is off the port. So they journey for half an hour. Engine revs are dropped from 1,800 to 1,600. The altitude increases. The fog is still fairly thickish, and visibility is barely half a mile.

Williams reaches for the map, and scrawls on it: "We'll have a hell of a time flying blind with this load."

Yancey writes back: "Yeh, but what a nice party it would be with 550 gallons." He adds: "Better burn out some of the load first."

Williams tilts the nose slightly, and increases the angle of climb. At 2,000 feet they emerge above the fog, but the clouds are still above them. At 4,000 feet they are above the clouds, which lie, a perfect gray carpet, beneath them. Air speed is 85 miles an hour, a fresh southwest wind is nudging the tail. Perfect flying weather.

Yancey writes on the map: "Swell."

They are now flying blind—by instrument only. The solid layer of cloud insulates the ocean. Yancey, realizing they won't be able to sight Point Sable, shifts the course south. Decides to make it an all-water hop. He bends their course 600 miles below the Great Circle.

Williams is burning up the fuel in the wing tanks, and Yancey writes the caution: "Better keep the wing tanks full. If we get into trouble, we'll have gas to fly some place." Williams nods, and begins to pump fuel from the fuselage tanks to the wings.

"Don't seem to be a let-up in this fog," Williams writes.

But two hours later it does begin to break up. Holes appear, and through them they see water—their first glimpse of it since they started. They sight a tramp steamer, nearly a mile below them, a black spot in a hole of gray.



Mussolini (left), Balbo, Italian Air Minister (center), and De Pinedo (right), waiting at the airport for the arrival of the fliers.

Only a few low clouds remain by this time; the air is perfectly calm, and so is the sea. "Do you think we can get by at night if we hit low clouds?" Yancey writes. Williams smiles and wiggles his fingers, to show them spinning down. "Cheerful thought," Yancey jots in reply.

Presently they run into low clouds, and the ocean becomes obscured. The Whirlwind is roaring nicely. Except for the clouds, which lie in two layers, above and below, conditions are perfect.

Yancey studies them, and writes to Williams: "I think they will clear up soon. Two layers never last long."

And so they continue. Sunset steals up behind them, over the left wing. It advances very slowly. Behind are the painted clouds, and ahead a sky changing from golden gray to rich purple, and then to black. This is the most ticklish moment for them, and they concentrate on the instruments, Williams flying and Yancey checking on the fluttering fingers on the dials. As the horizon melts and becomes ocean, blind flying becomes a fine art. There is no fixed point upon which to balance the ship.

But having practiced in anticipation of just this situation, Yancey and Williams soon surrender their watchfulness; neither has any difficulty in maintaining the course. Twilight fades into night, and the brightest stars flicker up ahead. They switch on the dashboard light, and Williams yawns:

"Do you figure our speed at 115?" he asks—on the map.

Yancey nods: "We must have a wonderful tail wind!" he jots in reply.

An hour after darkness came on, Williams turns over



Part of the tremendous crowd which greeted the fliers in Rome



the controls to Yancey, climbs on the fuel tank, sinks a pillow under his head, rolls himself in a comforter, and goes to sleep. Two hours pass. It is pitch dark; the moon is in the last quarter, and cannot be seen. But Yancey has little difficulty in following his course. The tachometer now shows 1,550 revolutions per minute, and the altimeter 8,000 feet.

It nears midnight. A squeak puzzles him, but he cannot locate it. The tachometer cuts out. So that was it! Yancey concentrates on the air speed indicator. And then the earth indicator compass, with a few weird gyrations, goes to pot and joins the tachometer in its droll byplay.

Blind flying becomes a bit too complicated. Yancey reaches up, gathers what little of Williams' retreating hair is available, and yanks vigorously. Williams stifles a yawn, rubs his eyes, and moans: "What the Hell! G'wan and fly it yourself." But he takes over the controls.

"Do you think," Yancey writes, "I can crawl back to the tank?" Williams nods.

Yancey crawls back, flashlight in hand, and removes the cover of the generator operating the earth inductor compass. He has just replaced it when he feels Williams rock the wings—a signal to return. He crawls back, and Williams points toward the steering compass. It, too, has caved in.

"We can't repair any of them," Yancey shouts. "We'll have to use the seat compass." It is the compass set in the seat between them, which they have provided for just such an emergency. Fortunately, it is unaffected by the demise of the others. Yancey returns to the controls, and Williams, not a little offended by what he terms "this unnecessary interruption," goes back to sleep.

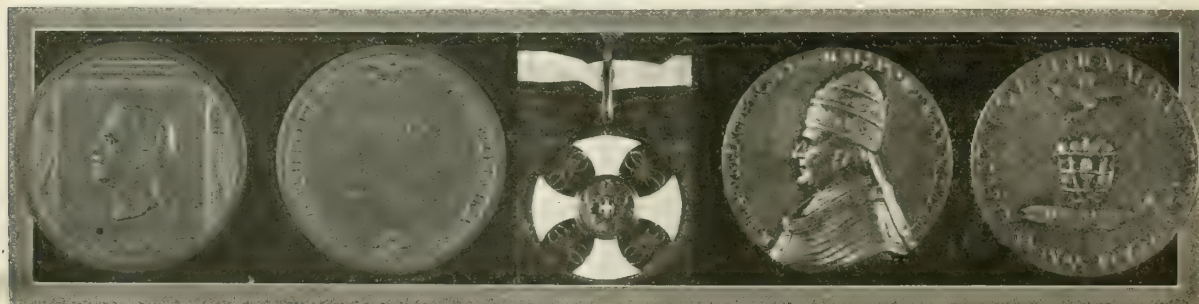
About two o'clock, he replaces Yancey, who scrambles atop the

gas tank, pulls down the trap-door and "sights" the stars. The weather continues beautiful; a fading fragment of the moon is visible dead behind. The are 8,000 feet high.

(Continued on page 312)



Upper: the crowd which gathered after the "Pathfinder" landed in Spain; center: Williams and Yancey taking off at Old Orchard; lower: the "Pathfinder" in the hangar at Rome



Medals presented to Williams and Yancey (left to right) by Mussolini, the King of Italy, and the Pope

# EFFECTIVE SALES METHODS

By B. D. Adams

*In Charge of Sales for the  
Ryan Aircraft Corporation*



B. D. Adams

THERE is little question but that the main problem confronting the aircraft industry today is that of developing effective sales outlets. The Aeronautical Chamber of Commerce reports that in 1921 not a single new plane was manufactured for purely commercial or private use, whereas in 1929 the industry will probably produce about 10,000 planes, probably not more than 2,000 of which will be taken by the Army and Navy. Selling these ships, obviously, will not be as easy as in the past.

By this I do not mean that the industry has anywhere near attained its potential production and consumption, but merely that far too little has been done toward developing a popular and business market for planes during the past three years. This condition obtained principally because, with limited production, purchasers were fighting for each ship as it came off the production line.

During that three-year period, however, perhaps a dozen of the larger manufacturers began to foresee the impending change of conditions and paid large amounts in commissions to distributors and dealers for sales which they probably did not develop. The Ryan Aircraft Corporation has always believed in closed territory, giving the distributor full commission on all sales made in his territory, regardless of whether the sale was made by a factory sales representative or to an established customer. By paying such commissions, which some sales authorities might regard as unnecessary, we have built up an active sales organization covering the United States and several foreign countries.

Each distributor has an exclusive territorial franchise to a state, group of states or a particular section. We require each distributor to fulfill the following requirements:

Keep a new model plane always available for demonstrations.

Contract for a certain number of planes a year, depending on the number of potential prospects in his territory.

Have at least one man devoting practically his full time to airplane sales.

Place a deposit to insure good faith in taking a contract.

These requirements almost invariably eliminate those who do not intend to make a serious effort to develop sales in their territory, and go far toward thwarting the few organizations which sometimes try to get distributor's or dealer's contracts merely to obtain the discount on planes they intend to use for commercial operation.

We prefer distributors who are already in some phase of commercial operation. By operating schools, transport lines or other commercial services, the demonstrator plane can be made to produce a profit and yet be available when needed for demonstrations. The distributor is thus also in a position to offer service, piloting instruction, and storage space.

Because it is usually impractical for a single organization to attempt to cover an entire state intensively, each distributor appoints from one to ten dealers. To these sub-distributors various types of contracts are offered, depending on the amount of effort they are willing to put

into airplane sales work, the responsibility they will assume for working their territory, and other similar conditions. Certain dealers are not able to handle a large territory effectively but are willing to maintain a demonstrating plane, and sometimes a full-time airplane salesman.

These organizations are given sub-distributors' contracts allowing them commissions of from 15 to 25 per cent, according to the responsibility they are willing to assume for sales. We attempt to keep an active dealer in every aviation center in the country.

We believe that the automobile dealer will play an increasingly important part in the airplane distributing organization. Although comparatively few have as yet gone into intensive airplane sales, many of them are displaying airplanes in their salesrooms, and in some cases these displays have worked out quite well. However, because it is usually impractical to

use a display plane for demonstration purposes, the large investment tied up makes this a rather difficult arrangement, unless the plane is a small, inexpensive type. The automobile dealer usually has an intimate knowledge of the transportation requirements, financial status and hobbies of all individuals in his territory who would be in a position to purchase airplanes; and this information, together with the aggressive sales methods with which he is familiar, ought to produce results.

Several dealers in our organization have begun to use automobile sales methods in the airplane field. In such cases, the dealer ordinarily compiles a list of all corporations in his territory which do business over a large area, and all individuals who have incomes sufficiently large to permit the purchase of a plane. This list is then carefully rechecked to eliminate the names of those who are definitely known not to be in the market for an airplane. After these revisions have been made, a salesman who can talk aviation language, and who knows the types of planes best suited to various operating conditions, approaches each of these prospects. In many cases possible buyers can be convinced of the value of owning a plane when they previously had given no consideration to such a purchase.

This system has been found to bring particularly good results in the business field. At the present time over 100 corporations and business firms own airplanes, several of them operating fleets of six or more. What is more, this list is constantly growing. The factory keeps each distributor and dealer informed concerning the ever-growing number of ways in which airplanes help build up profits for business concerns. From this information the salesman is able to present a comprehensive plan to a corporation, showing how money can be saved and business increased by the use of a plane.

More and more, the modern salesmen of big business houses are beginning to travel by air, because the more progressive companies have found that a plane not only pays dividends in time saved and prospects reached (especially where the trip by automobile or railroad is impractical), but also has tremendous advertising value. In smaller towns the arrival (Continued on page 346)



# SOARING FLIGHTS AT CAPE COD

I RAN as fast as I could; fell over the edge of a cliff; somebody came falling over me, giving me

a kick in the ear as he went past; then five more men came hurtling through the air onto me, pushing my face down the side of the sand mountain as though I were a baseball player sliding for home. Then I jumped up with my mouth full of sand and cheered madly.

For high above me sailed the *Professor*, prize soaring plane of the AMAC Cape Cod Glider School making its first flight in America. I had been lead man on the right hand rubber launching rope. The start had been made from the sand bluffs at Corn Hill on the Massachusetts Bay side of Cape Cod where Peter Hesselbach a year ago made the record of four hours five minutes soaring in the *Darmstadt*. So short is the running place there that we had to jump right over the edge and down the side toward the beach 125 feet below. But we didn't mind. For Rolf von Chlingensperg, sent over with Heinrich Knott by the Rhoen-Rossitten Gesellschaft to instruct Americans in gliding and soaring, was riding the upwind, coasting with his nose out toward the bay, riding along the up-flowing air pouring up the cliffs from the sea.

That was the fourth of August. "Clingey" flew for fifteen minutes. He had flown back over the launching place and was about to turn where the sand cliffs slope down to an inlet. The wind slackened as he turned. He swung the plane directly into the wind and slid clear across the inlet to an exposed sand dune on the other side. He made a beautiful landing.

I had gotten my camera and gone down to the beach. The rest of the crowd was still up top. I rejoined them. Knott, who is chief instructor and had let Chlingensperg make the first flight, looked gloomy. We followed his gaze. There was a city block of open water between our shore and the place where the *Professor* had just landed.

By Daniel Rochford

bank. It was reversed and placed into the wind. Knott, still in his wet bathing suit, climbed into the cockpit.

The boys formed to handle the rubber catapulting ropes. I rubbed my ear and pretended to be very busy taking photographs.

"Pool oudt!" shouted Knott. The seven men on each rope walked forward. "Grrun!" shouted Knott. They raced for the cliff. But the wind had stiffened to twenty-five miles an hour. As the rubber ropes tautened and began to sing, Clingey let go the tail. Knott climbed as steeply as ever a slotted winged airplane climbs. Then he slid, quartering the wind, along the cliff. Over a high place

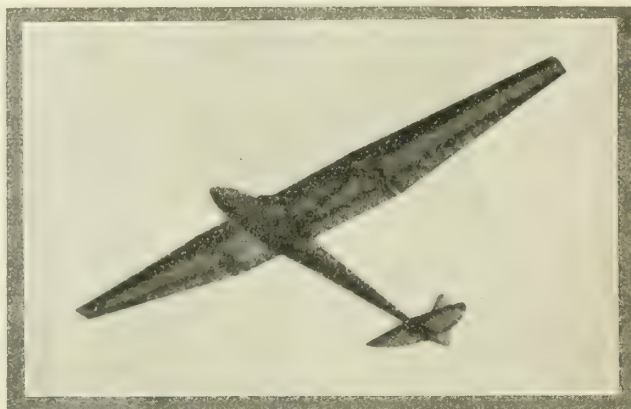
he turned into the wind. Almost motionless he hovered, pointed into the teeth of the breeze. Even as we watched he lifted above us. Higher and higher until he had almost 300 feet over the heights of the dunes.

Then off down the shore, a quarter mile, a half mile, a mile. Almost lost, a speck in the distance. Finally he turned. The sun flashed back from his wing top-side as he dipped for the turn. Then back over us. Ten minutes went to twenty; twenty to

thirty; thirty to forty. Finally after three-quarters of an hour he came again overhead. "I'm landing," he shouted. On over the cottages to the end of the bluff. An easy turn. A nervous instant, then, as the wind seemed certain to brush him back onto the hillside. He slipped the plane magnificently, down and out onto the airstream. Then nose down he coasted for some sand flats. The tide had been going out and nature had made a runaway out ahead of him, right into the wind. Down over it he skimmed, drifting to a perfect landing beyond.

He was shivering and blue when we reached him. His eyes were watering as though he had hay fever. We did not have to ask him why he had landed. The wind held until dark. He could have gone on that day to a new American record. He didn't. I wonder if flying records have ever before been merely a matter of woolen underwear and goggles?

Several of the American students wanted to take a crack at the *Professor*. But they hadn't qualified yet for their soaring ratings with the Pruefling school soaring planes and were refused.



The "Professor" on its first American soaring flight



Dr. Kuntz (left) checking wind velocity

But we got bathing suits and a rowboat and went after the sail-plane. We loaded its nose into the rowboat and forded the inlet. Volunteers from among the spectators were collected. We hooked a rope on to the nose of the sail-plane and hauled it right up the face of the



Heinrich Knott just after landing

Since those first flights, the school has had its Prueflings in the air many days. From the sand bluffs on the Atlantic Ocean side where the school is built, the students have sailed out over the sea, turning onto the beach. That last turn is not without its risks. The first student to land himself in the ocean was George O. Smith of New York, aged 19. He began his turn too late and nosed into about seven feet of sea. Excitement prevailed and even Major Clarence Doll, school commandant, rushed in with his clothes on to aid the rescue. Smith unfastened his safety belt before he hit and was only the worse by a ducking.

The first student to win the primary rating was John Perkins of Connecticut, a power plane pilot. The three ratings are based exactly on the German system; i.e., thirty seconds simple glide for the basic; one-minute glide, with left and right hand turns, for the secondary; and a five-minute soaring flight for the advanced rating. When you win all three ratings you are issued a license. But not until then. For, as General Manager Vergne Chappelle of the AMAC says, "There is no third or two-thirds about it. We give a license when you are qualified to pilot. Talk about licensing a flier who has merely made a glide, or a glide with turns, is like giving an auto driver a license for driving straight ahead, another when he can back up or turn around, and a third when he is fit to handle a car."

Whatever the glider events at the National Air Races may or may not show, the developing of the sail-plane sport in America demands centers for soaring flight. Gliding is good fun at first. But it becomes monotonous. The tendency is to try to get thrills by stunts.

Towing sail-planes behind power planes is naturally a trick only for qualified pilots. Wallace H. Franklin of Michigan has done this very successfully. Knott and Chlingensperg on Cape Cod plan a series of such flights in order to place their soaring plane beneath cumulous clouds. Then they will cut free and try to remain aloft by getting from one cloud to another.

The lifting currents are strongest just at the base of such a cloud. I have noticed countless times, when flying power planes up through cloud formations, that the clouds all seem to be as level at the base as though somebody had taken a knife and cut them off.

The very fact that the cloud is there proves that there is an up-wind. In fact, the cloud sits right on the top of the column of rising air.

Towing sail-planes behind airplanes was also done by Dale Drake in California early this year. Perhaps the most impressive example of this will probably have been shown to the American public by the time these lines are in print. I have talked with the German "air train" experts who came to this country last month and whose presence was kept a secret. They trail two sail-planes and then cut loose and perform all manner of antics.



Photo by R. E. Dowd

Sail-plane soaring over the beach at Corn Hill. Note beach at low tide and bathers at the foot of the hill

Such uses of sail-planes are for the experts. Soaring under proper conditions offers thrills enough for the beginner. But soaring centers are not numerous. Germany has now three great centers at the schools on the Wasserkuppe mountain near Frankfort, on the Rossitten sand dunes beyond Königsberg in East Prussia, and on the Riesen mountains of Silesia near Grunau. The last-named school has only recently attracted international notice. It started with local sail-plane club activities in 1924 and this year has begun to rival the other two schools. As described in the July issue of AERO DIGEST, I was able to win my one-bird rating at Rossitten, although I was there only one day this spring. The terrain is more favorable.

But Paul Roehre, commandant of the Rossitten school and the 1928 head of the AMAC Cape Cod Glider Camp at which Blunk earned his bird, told me that to win two birds at Rossitten a student must soar. The sinking speed, as they call gliding angle

for sail-planes, is such that the student could not possibly take a full minute to get from the top of the dunes to the bottom. He must ride the winds to delay his descent. Of course the five-minute flight is genuine soaring.

The mountain school at the Wasserkuppe, from which the two Cape Cod instructors this year come, is better as far as making the first two ratings, because the mountain is high enough, as I found out when I climbed it in an April snow storm this year, to permit of several minutes' straightaway gliding. The difficulty there is with the landing, because of rocks on the slopes and trees and brush.

It is wonderful that the National Glider Association was formed and is working so generally for the spread of the sport. It is fine that several manufacturers have now taken up making sail-planes. It is most helpful that the colleges with aeronautical laboratories are getting interested in problems of sail-plane design and improvement.

But the whole development of the sport, and its greater service to aviation as a step toward power plane piloting, demands several good soaring centers and schools for advanced study and for the teaching of sail-plane instructors who can return to the individual clubs and communities and be responsible for activities there.

Donald Walker of the N.G.A. visited the Cape school last month and was impressed with the new steel hangars, the dozen sail-planes of different types, the terrain, and the general organization of the camp. He believes the school will become one of the great advanced sail-plane training centers.

My own personal experience on Cape Cod has been that the other side of the Cape is better for soaring in the summer season. That was what Roehre said. The prevailing winds give soaring velocities much more regularly from the bay side than onto the bluffs where the school now is.

But the Corn Hill site, as may be gathered from the introduction to this article, is (Continued on page 354)



# AIR—HOT AND OTHERWISE

**J.** L. GARVIN editor of *The Observer*, London, is one of the real leaders of the British Empire's best and most constructive thought. His opinions are of moment because so often they have been entirely right, even though they may have stood alone at first. "Garvin of *The Observer*" is an unique figure, an individual power of the first magnitude among our English-speaking brethren overseas. And incidentally, he is one of the best friends the United States possesses.

We can very well afford to let him stir us to a bit of reflex thinking, British conditions as concerns Air Power versus Sea Power, and Land Power as he sees them, being virtually identical with American conditions as the thoughtful and impartial must appraise them.

One idea which runs through what he writes on this occasion is that there is intense necessity for, and wisdom in, a close communion and understanding sympathy conducive to a prolonged peace between the English-speaking races, consisting mainly of Great Britain, its overseas dominions and the United States, and that one of the most important obligations of the present international situation is reduction of expenditure upon naval armaments accompanied by increased generosity to air-defense. Reflecting on the tasks of the new British Government he says:

"Its first duty in world-affairs will be to enter into conference with the United States upon the future of sea-power and sea-law."

But the keynote of his plea to Britain is the keynote of AERO DIGEST's oft-reiterated plea to the United States:

"Development of civil aviation as a paramount aim of Government is essential to our national progress under peace, and is at the same time the surest contingent security. For these purposes we can alter the allocations and yet economize considerably on the total."

What most worries Garvin in the British situation is exactly that which worries us in the American situation. It is astonishing that such a problem should exist in a nation which actually heard the crash of enemy aerial bombs and carried out its dead in its great cities during the World War, but there, as here, the ignorant and desperate old services are so solidly entrenched that it is difficult to compel them into reasonably progressive thought. So Garvin on this topic is especially worth reading.

After admitting perplexity (which duplicates our own) arising from the fact that, in spite of the League of Nations, the Kellogg Pact and other such peace plans, the British Navy's estimates for the coming year call for £57,000,000, or approximately \$285,000,000, (its demand being that by rule of thumb it must have "as much as is spent by the Army and the Air Force put together"), he says:

"Its obsolete stiffness of attitude has incited the American people to build more than they wished. . . . And all this folly piled up at modern prices is called a modern policy of defence!

"We are not," Garvin continues, "going to war with America in any circumstances. Neither are we going to fight Japan . . . . We are not going to look around in search of people to fight . . . . If our affairs were guided in a great far-sighted spirit of peace-courage, we would

*An Englishman Who Thinks  
An Englishman Who Thinks He Thinks  
Hi in the N. A. A.*

**By Frank A. Tichenor**

deliberately allow Americans to transfer to their own shoulders a large share of the expenditure on sea-way security that we have borne singly through the long past. Only then they would not be so willing. And costs would come down rationally on both sides.

"With the Army we must all have a good deal of sympathy in several ways . . . its management is conducted with strict economy and with stirring efficiency. . . . But all the preparation of tanks and other land war machines, "leaves us fundamentally skeptical. It seems perfectly adapted to the war that won't be. Not to the sort of war that will be, if war returns. . . . We cannot employ armies abroad except at a monstrously disproportionate expense. We can best give our aid (if needed, in other ways . . . unless we are stark-bent on insular suicide. . . . We would be mad to think of expanding or replenishing for war purposes three services simultaneously. We must choose between them.

"For ten years we have maintained here that the arm of the future is the winged arm; that our whole system of defence should be recast from that point of view with the decisiveness of Cromwell. In the last five years we have been spending ponderously on the fleet and Army—£500,000,000 (\$2,500,000,000) altogether—under the influence of an ancient dream which is now a deadly fallacy . . . we have spent, or engaged to spend, upon the Air Force less than one-sixth as much . . . there never was a more antiquated, ludicrous and dangerous disproportion in the world."

Mr. Garvin continues that he feels this to be due to a secret, unconfessed influence which fetters the nation. How often in the DIGEST pages has that been said of the American situation?

"We do not play the part we did," says Garvin, referring to Great Britain, "because we have not got the surety of means we had. Without unquestioned, confident equality in the air-affair—taken as a whole, and including civil aviation—we are not, nor can be, independent and secure. . . ."

The men of the Air Ministry, he thinks, "have done their best with less than three shillings (seventy-five cents) out of every pound (five dollars) spent on defence. But what is the result after five more years of lop-sided stupidity? . . . we are completely dominated in the decisive element. France holds air-supremacy in the military sense, Italy, under Mussolini, has outstripped us in rate of progress. Above all, Germany is rising rapidly towards that peace-supremacy in civil aviation which is the surest means toward ultimate war-supremacy. . . ."

"Civil aviation can spread the poison-gas against which neither navies nor tanks can defend the crowded life of our cities . . . . Someday, at this rate, we might find ourselves more defenceless than what is called disarmed Germany. . . ."

"Development of civil aviation as a paramount aim of Government is essential to our national progress under peace, and is at the same time the surest contingent security. . . . The grand old Navy must face the ruthless truths of modern change. It cannot provide national defence against air-power. Neither can tank-supremacy or the other forms of Army (Continued on page 338)

# 17½ DAYS IN THE AIR

By A. W. League



Dale (Red) Jackson

**A**FTER 420 hours and 21 minutes in the air the *St. Louis Robin* landed under its own power at 7:38 p. m., July 30th, after having exceeded the previous world's rec-

ords by 173 hours, 37 minutes and 28 seconds. Dale (Red) Jackson was at the controls at the landing. Forest O'Brine, his air partner, handled the controls when the ship took off on its record-breaking flight July 13th.

For 17½ days Jackson and O'Brine lived together in cramped quarters with no connection with the world below except by notes handed down to them by Major C. R. Wassall and P. V. Chaffee, who manned the refueling plane. Food, oil and mail were passed down to them in metal containers on a rope from the refueling plane. They slept on a pneumatic mattress on top of the gasoline tank in the cabin of their plane. Gasoline was passed to them from the refueling plane through a rubber hose about two inches in diameter and about 35 feet long. At no time during the flight was it necessary to use the entire length of the hose and at no time was contact broken once it was established.

Without the thorough coöperation rendered by the service plane and its crew, the flight would not have been possible. The contacts were in no sense a simple operation. In order that the endurance plane might not have to climb back to its cruising height after she had taken on her supply of fuel, each contact was made at as high an altitude as possible; and each time the service plane was put to a severe test in taking off with its load, and circling for sufficient altitude. All of the air knowledge that Major Wassall has gained since he entered the Army Air Service in 1917, and the mechanical expertness of "Shorty" Chaffee has acquired in his nine years of experience, were needed in these contracts, which appeared so simple to those on the ground who watched their work. During the 17½ days Jackson and O'Brine piloted the orange-colored Challenger-Robin approximately 25,200 miles. Based on conservative estimates, their ground speed during the average flight was sixty-five

miles an hour. The plane consumed 3,500 gallons of gasoline during the flight, having taken on between 180 and 200 gallons a day. It consumed 158 gallons of oil. Oil was changed on an average of twice every twenty-four hours. Forty-eight contacts for refueling were made and seventy-seven for all purposes. Sometimes as many as three or four contacts were made on one trip.

The flight was sponsored by the Curtiss-Robertson Airplane Manufacturing Company of St. Louis. The plane was a standard Curtiss-Robin powered with a standard Curtiss-Challenger engine, a six-cylinder, staggered, radial air-cooled type, developing 170 horsepower at 1,800 revolutions per minute. This is the first instance in the last year in which a refueling endurance record has been set with a plane powered with an engine of less than 220 horsepower. Other recent records were set with Wright Whirlwind-motored planes. The plane was equipped with a catwalk, a narrow runway, four inches wide outside the cabin on each side of the fuselage, which permitted the pilots to make minor engine adjustments in mid-air. Jackson got out on the catwalk to inspect the engine twice a day. Working only six inches from the propeller, Jackson changed a few of the spark plugs and at one time opened up one of the magnetos and cleaned it. Other adjustments were made from the catwalk at various times during the flight on the power plant and plane.

According to a statement issued by Arthur Nutt, designer of the Challenger engine, who examined the power plant in the endurance plane, the motor was still in good shape after the flight. After 420 hours of continual flight it might be expected that the engine had lost some of its original power; however, the reports given by the fliers indicate that it was still delivering its maximum power. The fact that the engine at the end of the run was using less gasoline per hour substantiates this report. A slight additional amount of oil was being used, although this was negligible and resulted from slight external gasket leaks.

(Continued on page 314)



Forest O'Brine



Refueling plane establishing contact with the "St. Louis Robin"



# FOOL QUESTIONS FOR ALL

By Don Rose

SO far as I know, Mr. Thomas Alva Edison never invented an airplane.

But according to his admirers and press agent, he invented practically everything else, and he is certainly responsible for the custom of celebrating his own birthday amid the crackling rapid fire of a bombardment of questions. Whenever Mr. Edison has another birthday—and he has had lots of them—newspaper men with nothing better to do gather from far and near and shoot him full of question marks. Mr. Edison is wise enough, however, to discriminate against the more ridiculous queries. This spring, for instance, he responded to one reporter that a certain question was “too damned foolish to answer.” So it was. So were most of them.

It looks as though Mr. Edison lately resolved to get even. He decided he would get together a lot of bright young men, ask them a lot of mean questions, and make them like it. Out of this performance he proposed to pick the Ask-Me-Another Champion of the Universe and make him the heir and successor to his job as the inventingest individual in the world. It was a good act, and it got Mr. Edison and his electric light and his phonograph and everything else in which he holds a stock interest about three million miles of newspaper space at a very reasonable figure. Lots of big business men are now kicking themselves because they failed to think of it first.

Everybody knows, of course, that the young gent who knew all the fifty-seven varieties of information necessary to pass the Edison questionnaire has about as much chance of becoming a second Edison as I have of becoming another Horace Greeley. It's possible for a big man to pick his successor, but it's another matter to make the nomination stick. Big men who are about to step off the top of the ladder into eternity are fond of writing formulas for success, but nobody else seems to be able to make them work. And if Mr. Edison has a successor, he is likely as not a freckle-faced, hard-boiled, no-account youngster in some city high school right at this minute, more interested today in baseball, ice cream cones and dodging his chores around the house than in making himself useful to society. Some day he will be thrown up out of the ruck by the energy that is in him and will win his way in spite of handicaps rather than by aid of scholarships. But neither Mr. Edison nor anybody else would pick him today for a big man of tomorrow.

Colonel Lindbergh, who was one of the judges in this quiz party, probably thought about that while he was marking papers for the hand-picked forty-niners who came from all the States and the District of Columbia to decide how old is Ann. But he didn't say anything about it.

I first heard about this Edison questionnaire from my own son and heir, who is thirteen years old and looks right now like a serious waste of time. Back in the spring he busted wide open the peace and quiet of the family supper table with an announcement. “Pop,” said he. “I've got a job.”

If I had obeyed that impulse, I should have fallen off my chair. But a little experience with families teaches even parents to resist all first impulses and most second ones. So I dissembled my alarm and pretended not to be surprised. Maybe, I thought, the boy is going to amount to something after all. Maybe he is going to support me in my old age in the style to which I have never been accustomed. I didn't exactly need his help at the moment, but I wouldn't stop him if he showed even a momentary in-

terest in work. “What's the job, son?” said I.

“Thomas Edison is looking for the smartest boy in the United States,” said he. “It looks like I've got a job.”

Lately I have found a certain satisfaction in setting Mr. Edison's questionnaire in front of this confident young person and daring him to answer a dozen of the questions. He spoiled the effect of the lesson by daring me to answer a dozen myself. I took a whirl at it, but didn't get along too darned well. In the very first section I stubbed my toe on a mercury footwarmer, got tangled in a thousand feet of copper wire and blew up with an overheated automobile tire. In chemistry I did no better, and couldn't imagine how to distinguish between blue vitriol and manganese dioxide except that one is blue and the other isn't. The last question in the section suggested that I balance a polysyllabic equation by inserting the proper coefficients. But I couldn't find a coefficient anywhere.

I used to think that I was pretty good at mathematics. But none of the mathematics of my school days had any mice in them. The trick question in the mathematics section was just full of mice. By the time I had multiplied the original pair for a year and a half there were so many mice that I hadn't the heart to go on. So I jumped over that section and landed in the middle of General Questions, where I went to pieces like a record-breaking plane in a crowd of souvenir hunters.

What, for instance, would you do about moving a three-ton weight 100 feet horizontally and 15 feet vertically? Or even 15 feet horizontally and 100 feet vertically? And don't forget that according to the terms of the question you can't use any tools. I couldn't do it myself with all the tools in my workshop, which include a glass-cutter, three bits with no brace, a headless hammer, a corkscrew and an ingenious device for punching holes in harness, supposing that you have a horse that wears harness. The only thing I could do with the weight was to leave it lay, particularly since it is on an uninhabited tropical island in the South Pacific. If I was on an island like that I'd be too busy looking for a passing mail plane or enough coconuts for lunch to be bothering with weight-lifting.

Question Seven caught my eye. “What new discovery or invention do you believe would be the greatest benefit to mankind?” Right away I thought of a number of things. For instance, a nonskid soap for built-in bathtubs, a portable parking space for automobiles and a workable device for refueling the baby at two o'clock of a cold winter's night. Or a cheap and efficient substitute for rubber rolls in flying-field restaurants. Or an automatic muzzle for publicity agents or a magnetic detector for stowaways in transatlantic aircraft. But I hadn't the slightest idea which of these Mr. Edison was thinking about.

I went down for the third time and stayed down on the next question, which wanted to know what I would do with a million dollars. How should I know? I know what I would do with a hundred dollars. I'd spend it. I know what I would do with a thousand dollars. I'd invest it in the stock market and lose my shirt. But I've had so little practice with disposing of a million dollars that I would probably make a mess of it. It would very likely get me hung. Mr. Edison has no right to ask such questions. If he wants to know what I would do with a million dollars, he should give me a million dollars and find out.

So I didn't enjoy very much (Continued on page 332)



*The scenery along the Boeing air mail and passenger route between Sacramento and Reno is of unusual interest.*

## FLYING FROM SACRAMENTO TO RENO

ONE of the most interesting air journeys in the United States is that on the air mail route between

By R. K. Clark

of former gold dredging operations.

A few minutes after taking off, we were looking down upon Folsom Prison.

Sacramento, Calif., and Reno, Nevada. The distance is only about one hundred miles, yet each mile is replete with a panorama of matchless scenery; towering mountains, silent markers of territory which is so closely connected with the history of the West. An interesting feature of this trip is the opportunity it provides for contrasting the various stages in the history of transportation which was such a huge factor in the settlement of California.

The pioneers who faced the West to seek new homes, or gold, had at their disposal a mode of transportation known to Caesar and the ancient Egyptian Pharaohs—the wagon train. Records and diaries, some now on file at Sutters Fort in Sacramento, show that when these travelers reached the western edge of the wide expanse of the Sierra Nevadas, it required from three weeks to a month of heartbreaking travel to reach Sacramento, which was the Mecca of all travelers during the gold rush days. Compare this with the one hour which is required to cover the same territory in the comfortable cabin of a Boeing air mail plane.

It was my good fortune recently to make this trip. My journey started from Mather Field, located ten miles east of Sacramento. Incidentally, Mather Field is located almost exactly on the trail which the Forty-niners used when they first entered California. Leaving Mather Field at 7:55 a. m., the plane, which was piloted by Burr Winslow, crack pilot for the Boeing line, was soon flying 1,000 feet over the fertile fields between Sacramento and Folsom, situated in the great Sacramento Valley.

The American River, in which gold was first discovered in California, wends its way slowly down the floor of the valley. The only smudge on the face of an otherwise beautiful panoramic view was the ugly blotches of acres upon acres of land which had been the scene

From our altitude, which had now increased to several thousand feet, the walls and buildings of the prison looked for all the world like a toy fort.

Soon the country below us began to transform into a series of rolling hills, spotted occasionally with clusters of green trees, which showed up quite dark against the light green background of the fields. The American River was still in sight to our left, winding itself around the hills which were getting higher and rougher and covered with more trees than before. Looking ahead of us, the rolling hills quickly transformed into mountains thickly covered with trees. We were flying at about 2,000 feet over the mountains when suddenly a great chasm opened in the ground below us and we looked down into a deep

canyon. What appeared from our height to be a small stream flowing down its floor was the Middle Fork of the American River, a river of no mean size.

Five minutes later small cloud formations were beginning to drift by slowly beneath us. Ahead, and slightly below was a solid sea of white clouds which extended for miles in every direction. In a few minutes we were over them and the earth was shut off from view. We were alone in a huge sea of clouds. I shall always remember flying above the clouds. As far as the eye could see, a rolling, billowing sea of white unfolded.

Later the clouds passed quite suddenly from beneath us and not 1,000 feet below we again

saw the majestic rocky peaks and spreading forests of the Sierras, more beautiful in their roughness than before. For many miles in every direction a panorama of the most beautiful vista in the United States unrolled calmly and splendidly under our very eyes. Our altitude now was only about 1,000 feet from the earth below, and occasionally a towering peak rose up beside us.

The big Boeing plane rode as smoothly as a Pullman car. A small radiator in the (Continued on page 354)



**Aerial view of the California capitol at Sacramento**



# MODERN AIRCRAFT PRODUCTION METHODS

**J**UST as the airplane itself is introducing a new era in transportation history, so the production of

flying equipment is ushering in new ideas in manufacturing. Whatever may have been the care required in constructing previous man-made carriers, building modern aircraft involves immeasurably greater precision and attention to details. Earth-bound conveyors can incorporate weight greatly in excess of that required to provide adequate strength, whereas airplanes must be structurally sound with as little weight as possible. This particular requirement, together with the fact that the commercial demand for planes has been great only in the past three years, accounts for the aircraft industry's delay in adopting rapid production methods. For many years airplanes were built entirely by hand. Theoretical factors of construction had not yet been sufficiently proved to permit of more standardized methods. It was only with hand work, carefully and painstakingly done, that airplane manufacture could graduate from experimentation and trial and error. Not that the experimental period is entirely a thing of the past; it will never be as long as aeronautical engineers strive for advances in design. Yet certain structural theories have been so thoroughly tested and proved that large-scale production of aircraft embodying them has become practical. And so out of this background emerges the modern airplane factory, representing a triumph over problems for the solution of which there has been little precedent.

In planning aircraft production, there are several factors in the design of the plane which must be studied and worked out satisfactorily before the initial steps can be taken in laying out the factory and preparing tools and fixtures. These are: safety, airworthiness, performance, durability, comfort, and appearance. Although the relative importance of these qualities varies somewhat with the type of ship, in all cases safety is the great issue.

A safe airplane must leave the ground within a reasonably short distance, be able to climb rapidly under good control, have a reliable engine and controls, be structurally substantial, have no pronounced tendency to spin if stalled, and land easily.

Airworthiness implies stability, steadiness in rough air, and controllability with light or heavy loads.

If the ship is to perform well, it must be able to take off within a reasonably short distance and time, climb fast

By Robert B. Renfro

enough to obviate the hazard of obstructions and inclement weather conditions, have a sufficient service ceiling,

ing, cruise at a good speed and over a long distance, land at a low speed, and consume fuel economically.

Durability, always an important factor in itself, necessarily affects safety, airworthiness and performance as well.

The importance of beauty and comfort is becoming constantly more widely recognized. The time was—and not many years ago—when any sort of crate, no matter how unsightly, was considered satisfactory as long as it flew reasonably well. But now the plane must also be appealing in lines and finish, for air passengers invariably feel more confidence in a plane which is pleasing in appearance. Comfort in the air adds further to this feeling. At the present stage in air transportation, the layman's attitude in this matter is still of vital importance.

If the design of a plane has been developed to include these factors, preparation for its production on that basis is the next important step. Among the major considerations involved in producing a new model are: (1) simplicity of construction and assembly with as many identical fittings and parts as possible, (2) engineering, (3) detail, (4) fabrication, (5) testing. The production of the

first two or three planes is always more or less experimental, but if the engineering is well done, the calculated performance varies only slightly from that found by actual tests. From then on the problems of commercial production include materials, factory

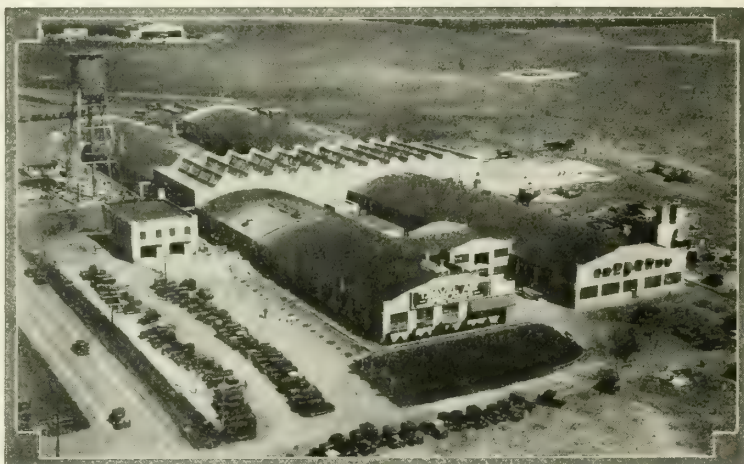
equipment, labor, and a production schedule.

The engineer's stress analysis of the structure largely determines the size of the members and the materials of which they can be made. The materials for construction are chosen, first, for strength, durability, and lightness; second, for ease of manufacture; third, for reliability of supply; and fourth, for price.

In no manufacturing business is the human element more vital than in the building of an airplane. But skilled workmanship can accomplish little with inferior materials. Tests must be made on glue, for instance, to determine the kind which behaves the best under service conditions. Similarly, cloth, shellac, paint, etc., must be tested for quality.

Price should be a secondary consideration. A few extra dollars spent on the materials of an airplane to insure

*Whirlwind powered Travel Air Monoplane*



*Travel Air factory*

*Wichita, Kansas*



*Specially built Travel Air three-place biplane*





Metal-working department at the Travel Air plant at Wichita, Kansas

highly experienced in fine lumbers should inspect all spruce, plywood, etc., that enters the wood-working department. Each shipment of steel tubing received at the factory should be tested for yield point, ultimate strength and elongation.

The engineering department is able to function more efficiently with the aid of these tests. With an accurate knowledge of the strength of steel used in fabrication, the engineer can design parts to a close degree of refinement. Fittings must be designed with the utmost care. The landing gear, which is subjected to much terrific punishment, has to be exceptionally sturdy. Control surfaces should be planes can be undertaken so simply with any success.

Factory machinery and equipment must be commensurate with production. It requires perhaps less equipment to manufacture an airplane than any similar product selling at its price. This means that anyone with a few tools, an acetylene tank and blow torch, some steel tubing, and an engine on order, can start "manufacturing" airplanes. But it does not mean that quantity production of good airplanes can be undertaken so simply with any success.

At the start of any new manufacturing endeavor, labor usually consists of all-round mechanics upon whose ingenuity and ability the success of the project largely depends. This applies particularly in the case of the airplane. As the organization grows, the labor involved in production becomes more specialized, for specialization is the basis of efficient production. The all-round man is replaced by a craftsman who devotes his time to one particular operation and thereby gains greater skill and efficiency each day. Often the all-round man develops

its performance, and possibly the lives of its occupants, are well worth while. Therefore, all structural materials, wood and steel, ought to be thoroughly inspected and tested. A man

can begin, however, all tools, jigs, apparatus, etc., must be laid out; the various departments thoroughly coördinated so that schedules can be maintained; and the labor situation fairly well adjusted and pretty thoroughly organized.

In order to gain a more complete understanding of all that such factory organization implies, let us consider the manufacturing process at a particular aircraft plant,—in this instance, that of the Travel Air Company at Wichita.

This company's first ship and many succeeding ones were built one at a time, by hand, in the rear of an old planing mill at Wichita. Men who had been flying for years personally worked at the benches to incorporate their experience into these ships. Other men, masters of their craft, gave their time and skill to improve and perfect every detail. Still other men who had come to recognize the importance of commercial aviation, and who saw the coming demand for planes built for endurance, safety and performance, were not afraid to stake their money in an enterprise directed to that end.

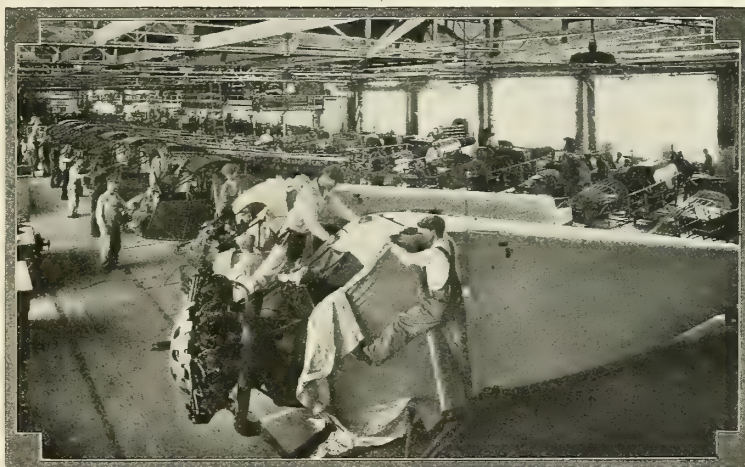
About four years ago the Travel Air Company reached the place in its development and progress where it felt justified in entering the commercial airplane field. With this decision made, the company was immediately confronted with the even more impor-

tant problem of a factory arranged, manned, and equipped for volume production without sacrifice of quality. Even with the experience of the automobile manufacturer as a general guide, there was little precedent to follow. Nevertheless, the obstacles were gradually overcome, and periodically the factory has been enlarged by the addition of new units.

About four months ago, the fifth and most recent unit was completed, giving a working floor area of over 116,000 square feet and permitting a production schedule of about 30 planes a week, of which approximately 20 are biplanes and 10 cabin monoplanes. Day and night shifts are now maintained and require a personnel of nearly 650 men. In general, line assembly is used in all departments.



Doping and polishing Travel Air wings



Progressive line production in the Travel Air plant, fuselage division



Engine installation department



Travel Air wood-working room



The manufacture of Travel Airs divides into two principal sections, the steel fuselage section and the wood wing section. These form the two main units of the airplane. It is logical, therefore, that the fabrication of each should be independent of the other. It is necessary, however, that the production schedules be coördinated in such a way that wings and fuselage are completed simultaneously for final assembly.

The complete production system of this five-unit factory has been worked out by efficiency experts to suit the particular requirements of the ships produced.

In the manufacture of the fuselage, steel tubing is first cut to the proper lengths on a power saw, which was designed expressly for aircraft work. The tubing is then welded up on a jig which locates each tube accurately, making all fuselages of the same type identical. Aircraft welding requires accuracy beyond the limits found in the manufacture of most other welded products. The weld must be rugged without being heavy or bulky. To accomplish this the welder must be particularly careful in running just the right amount of metal into the weld. Only by employing highly skilled welders and submitting the work to rigid inspection can uniformly good welds be insured.

Before the fuselage leaves the jig it is inspected and approved. It is then lifted from the jig and passed down the assembly line, where fittings, wood superstructure, controls, instruments and equipment are installed.

The stabilizer is constructed so that it can be easily adjusted while in flight. The adjustment on the cabin monoplanes is operated by a crank mounted at the top of the cabin. A shaft equipped with universal joints and ball bearings, and completely enclosed under the upholstery, extends back to the worm and sector adjustment at the stabilizer. The entire mechanism is rigid, free from vibration, and operates easily.

The construction of Travel Air planes provides for easy accessibility for servicing and inspection. The cowling can be easily and quickly removed. Zipper inspection covers are installed to enable inspection of control fittings. Concealed parts, internal structure, wires, fittings, etc., are made with great care.

Comfort is in no way overlooked in the Travel Air.

This company is incorporating comfort in its planes because it recognizes that the day has long passed when passengers or pilot are expected to endure discomfort in the ships they fly, just as the day of automobiles without tops, windshields, or spare tires has gone.

In the cabin monoplane, a spacious cabin permits passengers to exchange seats at will with the relief pilot while in flight.

This arrangement is especially suitable, too, for the owner who desires to take flying instruction. All six occupants face forward seated in upholstered wicker chairs, and with full front and side vision. This cabin is ventilated by windows similar to those of an automobile sedan. Large doors permit ease in entering and leaving the ship.

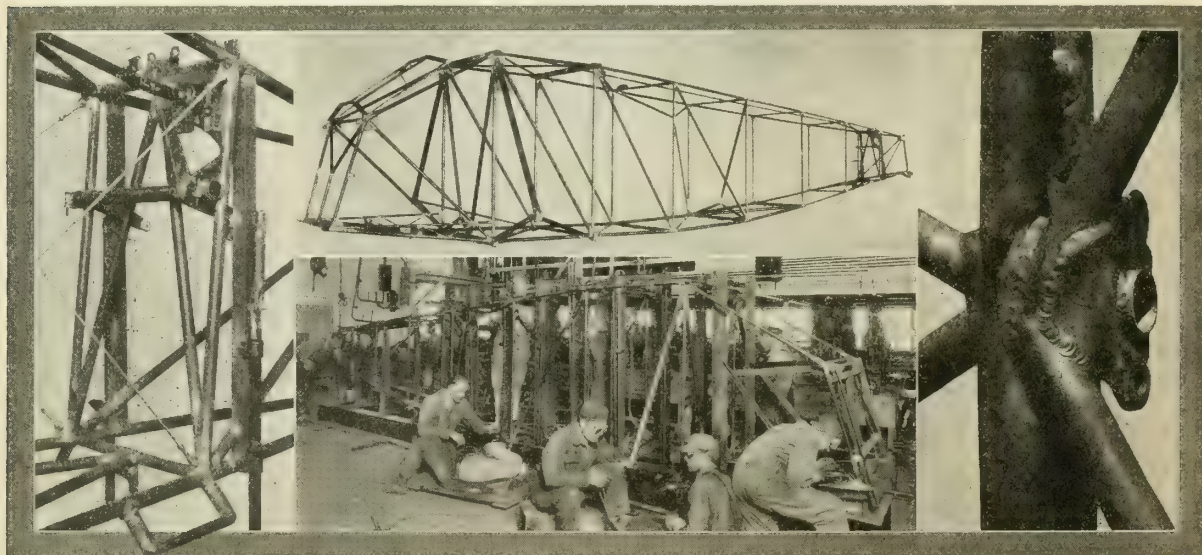
The wood superstructure rounds out the lines of the fuselage. The steel fuselage framework is completely enclosed by the woodwork to provide a clean looking interior. In addition to forming the lines of the plane, the wood superstructure adds strength and rigidity to the fuselage.

Before the plane leaves the assembly line it is inspected thoroughly. At this point in its construction all parts are looked over carefully and checked by the inspectors.

The next step in the manufacture is covering, then dopping, and finally painting the fuselage.

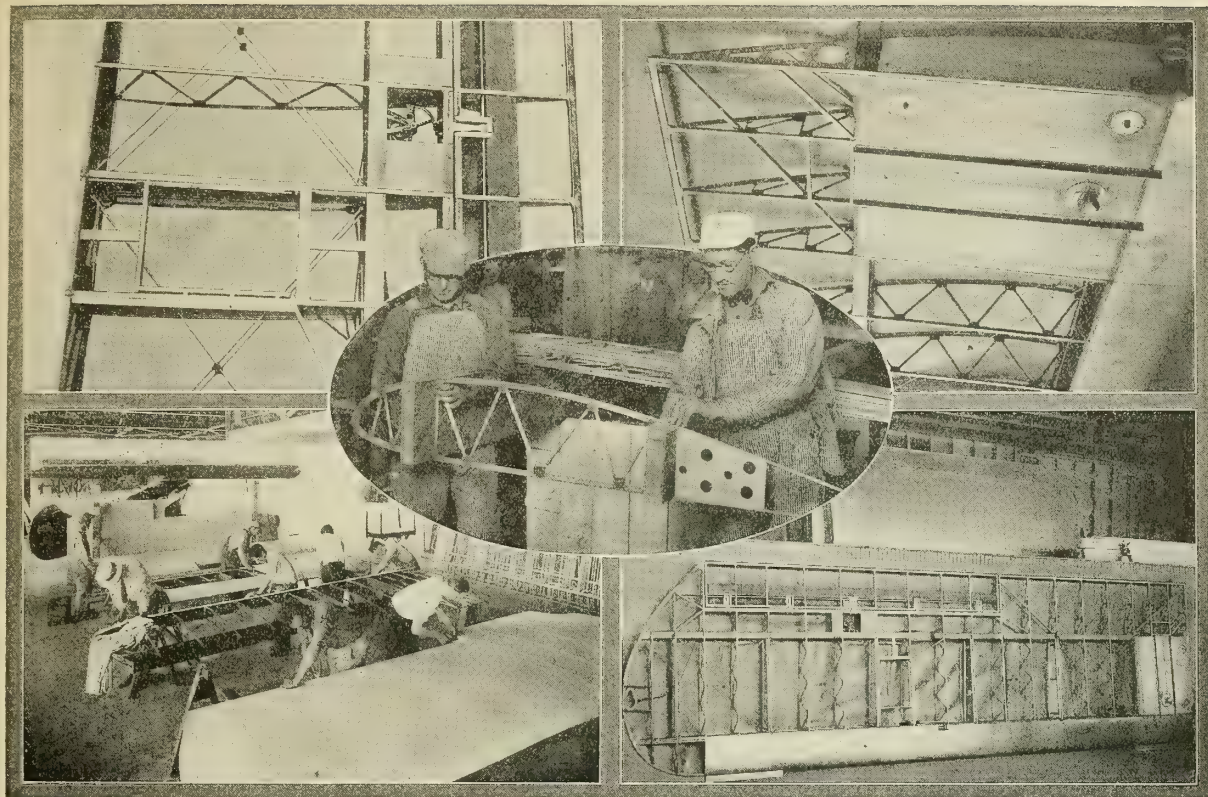
When the assembled fuselage receives its O.K. from the inspection department, it passes to the upholstering and covering departments where a high grade airplane cloth is stretched tightly over the wood and is tacked, and sewed. The cloth is then doped. Because of the shrinking qualities of the nitro-cellulose dope, the fabric is stretched drum-tight by the time three or four coats have been applied. After the last coat of dope has dried and the surface has been carefully rubbed down, the fuselage is ready for the first application of lacquer over the surface. As soon as the lacquer dries, it is rubbed down and another coat is sprayed on. This process is repeated until the required finish is obtained. The cowlings, struts and various smaller parts are painted separately. Metal parts receive two or three coats of primer before being shot with lacquer.

The fuselage passes from the paint room to the engine installation department. There engines are mounted, and gasoline lines, oil lines and controls are connected. Ex-



Left: tail surface control mechanism without covering; upper center: complete Travel Air cabin monoplane fuselage structure; lower center: welding a steel tube fuselage in the jig; right: detail welded fitting of a Travel Air fuselage





Building and covering Travel Air wings, and various details of wing panel construction

haust manifold and heater installations are made. The complete installation is then checked before the ship passes to the next assembly station where the cowlings, landing gear, and tail surfaces are assembled.

The cowlings are made by trained sheet metal workers. The cowlings are complete around the engine cylinders, exhaust ring, carburetor, etc., giving the ship a finished appearance. When the engine, landing gear, tail surfaces, and cowlings have been installed, the ship is complete with the exception of the wings and struts.

The plane is returned through the paint room once more for a final finishing and polishing and then enters the final assembly and rigging department. The wing is fitted into place, struts and wires are rigged, and the ship is given a final inspection before being test flown.

It is necessary that the wings be ready for assembling at this point. By maintaining a rigid manufacturing schedule, the simultaneous completion of wing sets and fuselages is possible. This coordination of these two main manufacturing operations, in turn, makes possible an uninterrupted production of completed ships. Adherence to the straight line production method, accurate parts scheduling and stock control, of course cuts factory costs considerably.

The wings form the other important unit of the airplane. These are manufactured in a separate building adjoining the paint and dope department.

The lumber storage is located at the extreme end of the wing factory. All wood is drawn from this stock and is carefully inspected before going to the mill room to be cut to the proper size and shape. The well-equipped mill room furnished with the most modern machinery presents an interesting contrast to the hand made methods of only a few years. The use of jigs for cutting and drilling, as well as assembling, means accuracy and a large production

from a few workers. Each part is cut so that, when assembled, it fits smoothly and closely into its position.

Two spars form the backbone of the wing. Because so much of the structural safety of the plane depends upon their strength, the spars must be designed and fabricated with the utmost care. The two spars are held in place by the ribs. The ribs serve two purposes, as structural members and as shape-forming members. The ribs are not merely slipped on the spar and allowed to float loosely, as in some designs, but are fastened rigidly in place. At the leading and trailing edges they are tied together by means of a light strip of duralumin.

In the biplane wings the spars are built in two halves, glued and pressed together. The monoplane spars are built up of laminated wood. By a careful design and selection of material, great strength for a given weight may be obtained by the laminated process.

Material that has been milled passes to the wing assembly department and is assembled in jigs. Ribs are built up first in separate jigs and are then assembled on the spars. After the ribs are assembled, the wing gasoline tanks are installed. The tanks are held rigidly in place and are mounted on felt to reduce vibration. The section of the wing at the tank is covered with plywood to give additional rigidity.

In the wing may be installed landing lights which retract to reduce parasitic resistance. These are worm driven by a crank located within reach of the pilot. All Travel Air monoplanes may be equipped with this type of landing light.

The ailerons are of the inset hinge, or Frise, type.

When completely assembled the wing is inspected carefully by an expert. A defect, no matter how slight, gets a

*(Continued on page 356)*



# PSYCHOLOGICAL POINTS IN MERCHANDISING AIRPLANES

**T**HUS far in the progress of aviation, manufacturers have been concerned mainly with construc-

By Willis Parker

many other business firms are willing to pay a premium to obtain telephone numbers that are readily recollected,

tion principles and their application; design and price; production methods and performance. The next important phase is merchandising, which includes advertising and salesmanship. As new models are produced and new aircraft manufacturers enter the field, we may expect the advertising manager to be more frequently consulted when names, prices and slogans are selected, because it will be his task to translate these factors into publicity which will seize the popular mind and which will enable the sales force to function more efficiently.

Behind the advertising of the new type of cabin plane recently developed by the Alexander Aircraft Company of Colorado Springs are several psychological factors which may well be considered by others engaged in the merchandising of planes. They have to do with Name, Model Numbers, Price and Slogan.

The aeronautical world already has heard brand names which present a mental picture of air performance. Among them are "Swallow," "Robin," "Command-Aire," "Travel Air," "Flamingo," etc. When such names are presented to the air-minded public, they arouse pictures of speed or safety in the air. "The Bullet," which is the name of the new product of the Alexander company, probably presents a more potent mental picture of speed than any other yet adopted, inasmuch as we commonly associate bullets with a greater speed than that of any bird. We think of a bullet as traveling so fast that the eye cannot register its motion. From a psychological standpoint, it is doubtful that a better name could have been chosen.

The next factor to be impressed upon the public is size or model numbers. In this instance, we have numbers corresponding to numbers used to designate the size of bullets. They are .22, .32, and .45. When these numbers are presented to us in connection with firearms, we associate the .22 with a firearm or a bullet of the smallest calibre and probably the most popular of all, being used for hunting small game, or for target practice. Probably more .22 rifles are sold than any other size, except, of course, models sold to the Army.

The next in size is the .32. We picture a more serviceable firearm or shell; one having more power, greater carrying capacity and more speed than the .22. The .45 presents a picture of an honest-to-goodness firearm which has a long range, terrific power and speed, and a capacity for bringing down big game.

When the two ideas are associated—firearms and airplanes, each bearing analogous model numbers—it is easy for us to picture the model .22 Bullet airplane as a small capacity ship of short range and more general use, a sport model. And we picture the .32 as being a ship of more capacity, greater range and power, and perhaps more serviceable as far as air travel for the family is concerned. Intuitively we realize that the .45 is a big fellow, with great power and flying range.

The association of the two ideas makes it easy for us to remember these facts about both, and, by playing up these points in the advertising, the message should be and is more effective.

The third element is the price. Taxicab companies and

because they know that wherever the telephone is an important medium for obtaining customer contact it is of tremendous value to have a number that is easy to remember, easy to present in all forms of advertising designed to eliminate the necessity of the prospective customer's consulting the telephone directory, and thereby running the chance of being influenced by the directory advertisements of other concerns in the same line of business. It is easier to remember the number 8,888 than it is to remember 8. Likewise, it is easier to remember 8,888 than it is to remember 8,765 or 8,719.

Recent advertisements of the Alexander Aircraft Company quote two prices for the .32 Bullet, the variation being due to the difference in engines. One price is \$6,666 and the other is \$8,888. They were chosen because they would be easy to remember. It is understood that, in each instance, the manufacturing cost was so close to those figures that a few dollars could be subtracted to obtain an easily remembered price, and the difference could be safely charged to advertising.

The next factor that the advertiser strives to impress on the minds of the readers is the carrying capacity of his ship. In the case of the Bullet, the firm has incorporated the carrying capacity of the model .32 in a sort of a slogan which captures the popular imagination. It is "4 people and a dog." That is far more effective than to leave it simply 4 people, or to give the poundage or merely to state that it is a four-place machine. The slogan does not mention the size of the dog. It might be a lap dog, or it might be a St. Bernard. That makes little or no difference, but the reader supposes that there is a trifle more room than is actually required by four persons, and the additional space represents to his mind a little more comfort in traveling.

Moreover, the slogan is easy to remember, which is an important point; for if the advertiser can impress upon the minds of readers the plane's carrying capacity, the effort required of his advertising copy will be less.

It is noticeable that, up to the present time, the advertising and sales appeal of the manufacturers of airplanes and the operators of flying schools has been based more upon the thrills, pleasure and recreation that flying offers, than upon the practicability of aviation for business, though the business side is being stressed more and more.

Is it not logical, then, to assume that the word "Bullet" has an element of appeal to man's sporting instincts, to the instinct that leads him periodically to shoulder a gun to seek recreation by stalking game? If the appeal is based upon thrills, pleasure and "he-man" recreation—life in the open—surely an article associated with it in name will get attention.

But, you say, we've got to get the business man interested—we can't appeal entirely to the daring side of aviation. That's true enough, but isn't it true that thousands of business men get their recreation from the hunt? They are familiar with hunting terms and the terms associated with the implements of the hunt. Surely the aforementioned appeal or some similar appeal will react upon them as well as upon the habitual sportsman.

# NON-STOP FLIGHT IN A HANSOM CAB

WITH all these recent endurance flights the mind, so-called, of the public is being focused (or perhaps hocused is the better word), is being hocused upon aviation. And the idea is gradually seeping into the public consciousness, or semi-consciousness in most cases, that in future years airplanes will remain in the air constantly, continuously, and very

monotonously, the while a devoted friend, who is scarcely mentioned in the gnuspapers, feeds it with gas, oil, water, salad, roast chicken, hot coffee and other odds and ends. Further, it appears in the happy years to come, airplanes will not land even to embark or disembark passengers. The passengers will be let down in a sack from the re-passenger plane to the transcontinental 100-passenger non-stop, non-flop aerial jilloppie, which will not even pause for breath but will go roaring unconcernedly on its way, caring not one jot, not one tittle whether the passenger made the grade or missed the tail-skid by an inch. When the jilloppie gets to where it is going, and from which place it will return without stopping, the passengers will be thrown off. And may Heaven protect the working girl who has her parachute straps fixed with safety-pins.

This much I, in company with a wondering and amazed public, gather from the gnuspapers. We learn that life is being lived each day at a more furious pace; that none of us have any time, or that if we do have any time, we don't know what to do with it; that we must rush hither and yon, and back to hither again, at breath-taking speed. They now have a plane so fast it simply takes your breath away; it's called the Lockheed Listerine. Even cotton print dresses that are the vogue this summer are being made in fast colors. That just goes to show. The cry is for speed, more speed, and no stops. Nobody must stop, even for a rest. A man driving a car under 35 miles an hour is fined for parking in the wrong place. They're changing all "Stop and Go" signs to make them all "Go." The "Stop" sign is no longer popular except with pedestrians, a vanishing race, practically extinct in America.

To an old moss-back like me it appears that the time has come to protest against this speed, to de-focus the public mind from aviation and re-focus the public eye—slightly bleary after eleven years of the Noble Experiment—upon the horse. I said THE HORSE, gentlemen. Perhaps you haven't seen one recently, but they are still extant in limited numbers—there are two in Philadelphia, one in Newark, another in Kankakee, and one, if I am not mistaken, in the Public Library in Boston, in the archeological department. I have asked the Editor to

By

*Cy Caldwell*

procure a good likeness of a horse so the younger reader will know what I am writing about.

I am very fond of horses. In fact, I used to be in the Cavalry and would have been in it to this day, only instead of handing me a saddle and bridle the Government equipped me with a shovel. After I resigned from the Mounted Troops, shortly after the

Civil War, I did some betting on the race-tracks; but the only time I ever made a clean-up following the ponies was when I was in the Army.

Loving horses, and an odd brunette here and there, it occurred to me that the way to bring the horse back into favor was to follow the lead of the airplane boys and do a non-stop flight in a hansom cab, or sea-going hack, as we used to call them in the old days. I can recall, as a youth, falling into a hack about 2 a. m. and being driven about the streets the rest of the night, shouting or sleeping as I desired, and being delivered at the back door in the morning. If I made enough noise, father would get up and bring me and the milk in; if I was too far gone for that, father wouldn't wake up, and the hired girl would bring us in about seven. Sometimes the milk and I were separate and sometimes we were hopelessly intermingled. When the latter condition prevailed I always blamed it on the fact that I was unsteady due to the swaying of the cab.

Once I had decided on this flight, the first problem confronting me was the procurement of suitable equipment, most important of which was the horse and hansom cab. To any but the greatest minds this problem would be insoluble. Where, I ask you, would you go to find a horse, let alone a hansom cab? I'll bet you don't know. Well, I'll tell you the one spot in the American motorized scenery where such a contraption may be unearthed—on Fifth Avenue, New York, in front of the Hotel Plaza. There I went with my co-pilot, Bill Ankoo, who has been flying with me between Cairo, Illinois and Cairo, Egypt, carrying Persian rug salesmen with such monotonous regularity that he was willing to do anything for a change. Bill and I have been rotating between those ports so regularly that we know what a metronome feels like.

Right in front of the Plaza we found a cab with a very ancient horse, sleeping in front of it, and an even more ancient cabby sleeping inside it. There was a block of wood behind a rear wheel in case the horse moved in his sleep and backed out into the traffic. Now the problem confronting us was how to get the horse and cab away from the cabman. I knew those old cabbies well enough to realize that they wouldn't sell their cabs, though nobody rides in them and the owners



"Us", Cy Caldwell (right), and his power plant "Whirlwind"

(Cont'd on page 320)





## THE "YARDSTICKER" SAILPLANE

**I**N the August issue of AERO DIGEST we took up the description of the Wind-jammer paper glider and by this time you have doubtless some splendid flights on record. We presume a good many hundreds of pounds of paper in the form of Wind-jammers have been cruising the air during the last month. More power to you, Boy! Let's hear all about your records, but in the meantime here's a nifty Sailplane for your next model.

It doesn't seem possible that any boy has escaped hearing the time-worn pun, "Did you ever see a horse fly?" or that other one, "Ever see a board walk?" We knew you had, but here's a new one: "Did you ever see a yardstick fly?" We have, and we're going to tell you all about how to make the neatest sailplane patterned after the famous German record breaking soarers, all from an every-day yellow yardstick, the kind your hardware dealer gives away to advertise stoves and other merchandise. The name sailplane has become used as a result of the wonderful glider performances of German experimenters with gliders "sailing" on rising currents of air.

Oh! that reminds us of what the "wise cracker" said: "I have a yardstick but I don't use it as a *rule*." As a matter of fact we're not either. We're going to use it for wings and fuselage, so let's go! Here is what you need:

### Materials for Your Sailplane

Only 6 items:

One soft wood everyday, county fair yardstick. (These usually are stained yellow and carry advertisements.)

One piece of tough cardboard, about the thickness of ordinary name cards or correspondence cards.

### HOW TO BUILD AND FLY ONE

By R. E. Dowd

One piece of stiff wire (music wire is best), about .020 inch in diameter.

One or two small rubber bands.

Some glue or cement and some thin shellac.

A strip of sheet metal about  $\frac{1}{2}$ -inch wide,  $\frac{1}{32}$ -inch thick and approximately 2 inches long. (Steel, tin, lead, brass or anything handy will do.)

Tools you should have are:

A plane (small block plane preferred), a sharp knife or razor blade, a pair of scissors, a pair of pliers, a small brush for shellacing, some fine sandpaper, and a few pieces of broken window glass for scraping.

Well, there's nothing very hard about getting the material and tools together, so let's get started on the building. One more thing before we start. Let's resolve to do some real fine workmanship in every model we build. Good workmanship pays high rewards when you take your finished model out to fly. It is wonderful what fine work can be turned out by willing hands if only the decision is made at the beginning to do a careful job. Sorry to lecture, boys, but you'll be twice as proud of the finished model and she'll fly like a demon if you'll just do a nice job of it.

The standard yardstick measures  $\frac{3}{16}$ -inch thick and  $1\frac{1}{8}$  inches wide. Guess we don't have to say how long it is, do we? Well, first plane one side flat, just lightly so that the coloring is removed. This will allow you to inspect the grain and to select the best 18 inches of length in the piece.

Now cut this section out for your main plane. Notice we do not call it a wing, because strictly speaking a wing is only one-half of a plane. In other words, we have a plane made up of right and left wings. Airplanes are so often called 'planes for short that there is a tendency to call the actual plane a wing.

Now having one surface flat, we plane the piece down to a  $\frac{3}{32}$ -inch thickness. That's pretty thin but you can do it by holding one end fast to a flat board and planing away from you. If you do this, reversing the ends frequently, you'll soon have the old yardstick looking like a brand new piece of wood.

Now for the Airfoil section. Does that sound too complicated? See figure 5, which is a view of the stick and how it should be planed down. The shape is called an airfoil, since it is designed to obtain certain reactions from the air. The bottom is flat, the front or leading edge is thick, while the rear or trailing edge is thin. In full-size airplanes each wing section or airfoil has a special name or number and designers choose them very carefully to get the best results. Colonel Lindbergh's *Spirit of St. Louis* had a wing curve or section known as Clark Y. This is quite similar to ours but somewhat thicker to give room for spars.

Well, just shape your curve and when it is all uniform from tip to tip, plane the tips up on the bottom as shown in the front view, figure 2. The thickness at the very tip should be only  $\frac{1}{32}$ -inch. Next make a paper pattern of the elliptical end shape and cut the tips to correct form. Wing tips can be of many different shapes without a very great change in efficiency but the one shown is not only efficient, but will not split easily in bad landings.

The plane is all finished now except for the rubber band notches and the two small holes for the wire brace to the fuselage. The holes can be made with an ordinary common pin gripped in a pair of pliers and forced into the leading edge carefully. They should be about  $\frac{3}{8}$  inch deep.

Before we leave the building of the plane we should learn about aspect ratio, which simply means the length or span of a plane, divided by the width or chord. Six is considered more or less standard (18-inch span, 3-inch chord) for aspect ratios, but sailplanes use them much higher to get greater efficiencies. Our little plane has an aspect ratio of about 16, which is quite high.



The completed 18-inch "Yardsticker" sailplane, ready to fly

# Next Build the Fuselage

Just plane, scrape or sandpaper the coloring from a piece of the yardstick  $7\frac{1}{4}$  inches long and then cut to the shape shown. The corners, except directly under the plane, should be nicely rounded off to reduce air resistance. With a thin-bladed knife or a safety razor blade cut the slots for the stabilizer and fin at the rear of the fuselage. Don't try to make the slot in one cut. Be patient and cut again and again lightly but deeper each time.

If you care to, you can exercise a whole lot of individuality in making new forms of fins and stabilizers. All designers do this and if you have any special shape you like you can design to suit yourself. However, the area must be kept very closely to what is shown on the drawing and perhaps you better stick to the form shown for your first model. The fin is just half of the stabilizer and both parts are cemented in place using glue or Ambroid cement.

Let's see, what else do we need? Oh yes, the wing brace. Just bend the wire into the form shown at the bottom of the fuselage and then bend so as to fit the holes in the leading edge of the wing. Better be very careful in bending for it must be quite accurate and true.

Now we can attach the plane to the fuselage using a single flat head nail about  $\frac{1}{2}$ -inch long. The nail used in the lid of a cigar box is just the right size. Everything is now assembled except the ballast and we can not determine that until the whole model has been shellaced or completely finished

with some thin waterproofing lacquer, because the finish will change the balance.

## Balance Your Sailplane Before Flying

The center of gravity or the center of "balance" must come  $\frac{3}{8}$ -inch from the leading edge. Open out a hairpin and file the ends to a knife edge and apply enough weight to the nose of the fuselage to balance the plane exactly at that point. (See figure 6.) Cut the metal strip to the correct size. Pinch temporarily to the nose of the fuselage and the final attachment can be made by turning the corners down so that they clinch into the wood.

A small piece of rubber or a rubber head tack may be used as part of the weight and will be found a great protection when your Yardsticker sails into a window or bumps Billy Jones on the nose.

Now for the fun! Your "Yardsticker" is ready to make the first flight. You'd better make the first trials in pretty calm weather so that the disturbing gusts of air won't bother making the final adjustments. If there should be a slight breeze be sure to launch directly against the wind. When we made the Windjammer we learned how to adjust for fore and aft balance. The rule is simple. If the model noses up, reduce the amount of upturn on the elevators. If it noses down, increase the amount of upturn. If she turns to the right or left quickly after launching, be sure you are not "banking" it as you launch it forward. If it turns and you are launching correctly, check up on your rudder. It should be absolutely true. If banking still persists,

try warping the whole plane, by twisting it. Of course the trailing edge should be warped down on the wing which is on the inside of the turn. When she's all set, give her a good hard launch with a full swing of the arm. Up she'll go—not 20 or 30 feet—but 75 to 100—and fast! You'll get the surprise of your life if you've been making light "floater" models. Now, for some stunts:

**Loop**—Launch level directly into the wind, pointing the nose upward.

**Right Turn**—Launch into the wind with right bank. (Right wing down.)

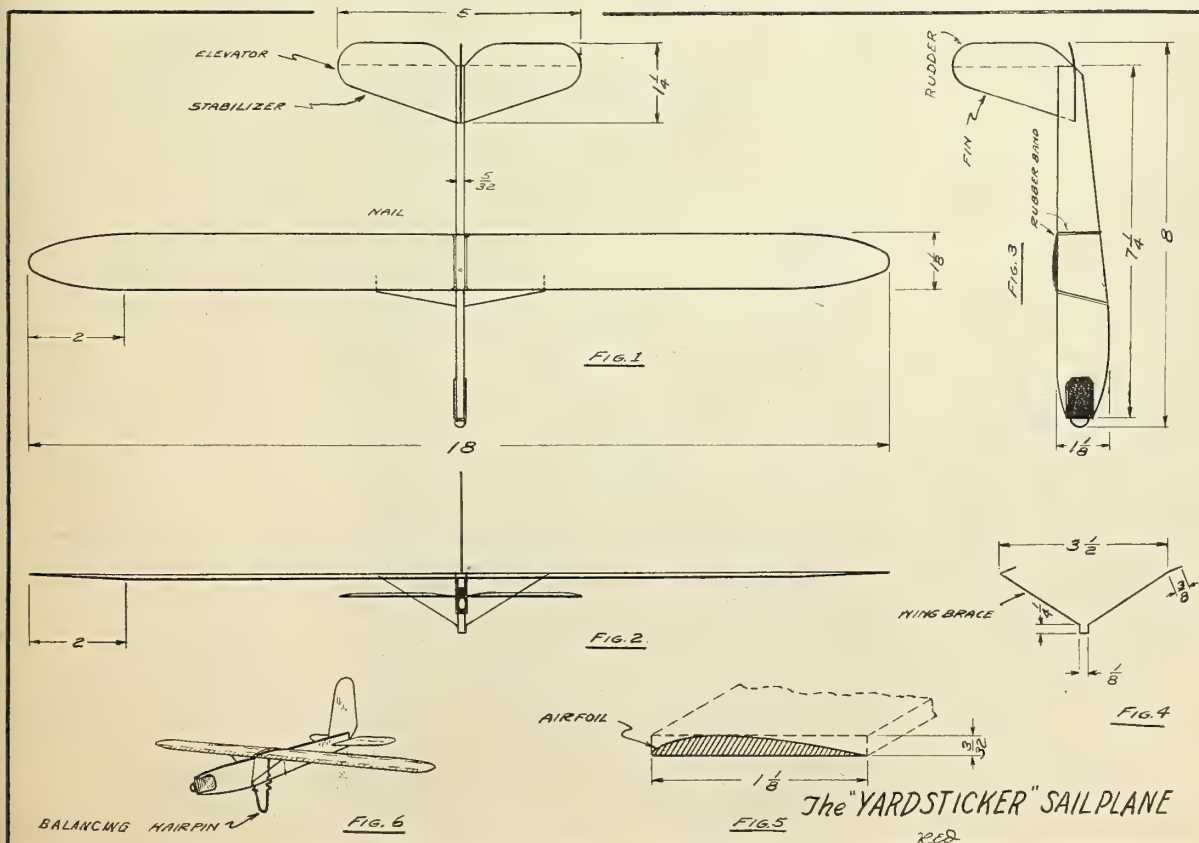
**Left Turn**—Same, but bank to the left.

**Figure Eight**—Adjust rudder by bending to the left (looking at the model from the tail) and launch with a right bank.

**Soaring**—Find a rising current, such as a gentle breeze blowing up a hill, and launch easily into the wind. Study the adjustment carefully to keep the flight straight. Turning loses height and you want to conserve all the height you can. Soaring is an art requiring active control for extended flights, but your little Yardsticker will give you a treat in short duration soaring if you'll take care in the adjusting. Let's hear all about your flights.

Here are the high spots to remember: 1—Sailplane. 2—Airfoil. 3—Aspect Ratio. 4—Fuselage. 5—Stabilizer. 6—Elevator. 7—Fin. 8—Rudder. 9—Banking. 10—Soaring.

[This series by Mr. Dowd will be continued in the next issue of Aero Digest.]





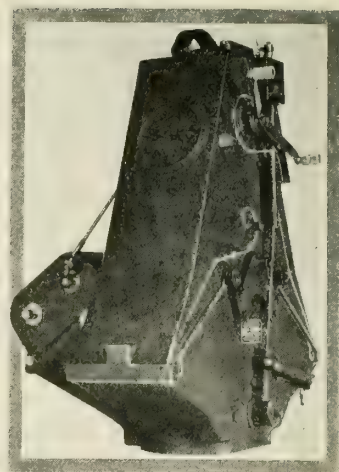


Lieut. Willis R. Taylor, Air Corps

# SHOOTING AT KENTUCKY WITH FOUR LENSES

By

Robert E. Faherty



Fairchild-Bagley four-lens camera

THE tipsy fellow who totters in trying to walk a chalk line has an easy task compared to that of guiding an airplane on an aerial chalk line 12,000 feet above Kentucky in an 80-mile wind. Lieut. Willis R. Taylor, 21st Photo Section, United States Army Air Corps, whose Douglas observation biplane undertook a shooting expedition with a Bagley camera over Kentucky, is authority for the statement that flying above the state's mountains in the first aerial mapping of Kentucky was not exactly an aerial picnic.

On several occasions on warm, sunlit days, Lieutenant Taylor left Bowman Field, Louisville, in fleece-lined boots and a heavy, fleece-lined suit and guided the army ship into zero temperatures at from 12,000 to 18,000 feet.

Meanwhile the Bluegrass State sat for her portrait while Private J. B. Dill, photographic expert, in the aft cockpit clicked the four-lens Bagley, which is a product of the Fairchild Aerial Camera Corp. And every time the camera's shutters moved it meant \$275 cost to the United States Geological Survey and the state—in the map product. The Geological Survey books show a debit of \$51.75 to the Army for every hour of the pilot's services.

Frankish winds frequently sweep through the Ohio River Valley, particularly on clear days. Camera-shooting from 12,000 feet of course requires a perfectly clear day, a rarity in that region. On one jaunt Lieutenant Taylor recorded a 105-mile wind at 9,000 feet. The big Douglas breasted the blow, but because the earth's face below looked like a homogeneous mass with no distinguishable features, the Douglas yielded and sought its hangar.

According to Lieutenant Taylor, who has been an army pilot for twelve years, skillful piloting was required for the Kentucky air portraiture. On the three or four days a month

on which absence of clouds permits high-altitude camera work, it was not unusual for an 80-mile wind to buck the ship. Nevertheless, the plane had to fly with abnormal stability if the Kentucky quadrangle map lines were to appear correctly in Lieutenant Taylor's laboratory at Scott Field, Belleville, Ill.

Consequently, the Douglas' nose sometimes was turned toward distant southern Indiana while the ship kept moving northward in Kentucky on a line toward Covington; or, if over the Blue Ridge Mountains, straight northward toward Portsmouth, Ohio. The cameraman had to adjust the big camera through the six-inch "finder" in the bottom of his "office" as the ship balanced against the wind.

The finished portraits of northern counties, however, revealed Kentucky as sadly wrinkled and of uneven complexion when seen from 12,000 feet.

Lieutenant Taylor did a part of the work of the fifteen-year program in which the Geological Survey is coöperating with states in accurately mapping, on the quadrangle system, areas heretofore improperly charted or unmapped. The aerial method is swift and accurate. Kentucky needed pictures of about 25,000 square miles, part in the northern counties and the rest in a central belt north and south.

From an altitude of 12,000 feet, the new Bagley camera records the features of a land area seven miles long and one mile wide. Four lenses take four shots, which are united in making the map.

Lieutenant Taylor said he found that the theory that the air temperature falls three degrees for each additional 1,000 feet of altitude can stand some revision in Kentucky, at least. Quite often the temperature fell much more rapidly than that. On some days it became so cold that the camera would not work because its oil be-



One of four views taken simultaneously by the camera

(Continued on page 350)

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## GOOD OLD CY CALDWELL

"TO me he is the greatest hero in the world. We owe our lives to him." Mrs. Robert Little, of Cedar Rapids, Iowa, paid the tribute, and we heartily agree with her.

She was referring to Cyril Cassidy Caldwell, whom we and our readers know as Cy Caldwell, fier, quaintly humorous philosophical writer, good friend and 100 per cent man.

On August thirteenth when his plane was forced down on Lake Erie during a bad storm and fog and began to sink, Cy swam four miles in rough water to the lake steamer lane and was picked up by the *Midland King*, which then rushed back and picked up Mrs. Little. Captain Burke of the *Midland King* said—"He is the most courageous man I have ever come across. He told me if we had not sighted him as he was swimming toward us, he would have swum to Canada. That swim was ten miles, and Caldwell was wearing his heavy flying clothes, but I have every reason to believe he would have made it."

Today, we have for Cy, whom we always have admired, a new and overwhelming admiration.

## PRODUCTION DANGERS

OCCASIONALLY we hear statements that sales are not as good as they were last year. One manufacturer recently complained that forty of his last year's jobs remained unsold. His trouble is not that he sold too few planes last year, but that he produced too many. This year better planes are being built. Of course he can't sell last year's jobs. He easily might build too many again this year and find himself with a more or less obsolete surplus next year, when still better ships will be offered and demanded.

It is inevitable that the purchaser wants the very latest improvements in the plane he buys. In 1927 he bought 1926 planes because they were all that could be found. Demand was great, supply limited. Now more planes are being built.

Manufacturers do well to watch their investment carefully. There is a distinct danger in building in '29 more airplanes than can be sold in '29. It is not logical to put liquid capital in planes with which to decorate a display floor. Better to lose the sale of a few planes during the balance of this twelvemonth than to have capital tied up in products the sale of which is problematical.

The market will very probably be better in 1930; but so, also, will be the planes. A lesson can be learned from the automobile industry. In the thirty years of that manufacturing industry's life, about 1,600 builders have started hopelessly in the business. Less than fifty are manufacturing today. The survivors are those who did not over-produce and turned out a worthily distinctive product.

Another thing: The successful aircraft manufacturer

must now make a real sales effort. It takes more than advertising to sell planes. All that advertising can do is to take inquiries to the producer. The manufacturer must not only provide the product which will please, but must efficiently back up a well-organized sales force—or he will not find his decks clear for new effort when the new year comes 'round.

## EXPERIENCE REQUIRED

AN appalling present need, recognized by manufacturers as well as by transport companies, is for pilots experienced in handling large, multi-engined aircraft. Such men should have flown under all possible adverse conditions, should have had at least 1,000 hours of flying time, should be of unquestionable dependability, should be versed in cross-country navigation, landing in unfamiliar fields, and other matters. Some of the insurance companies now demand a specified minimum of time flown by the pilot on the job before they will write a policy.

The transport companies can meet this situation. Their participation would be an assurance of safety, and upon safety depends the success of the aeronautical industry. Why do not some of the air transport lines using multi-motored jobs open a school specializing in this training, allowing the approved student to become second pilot on regularly flown services? He thus would have instruction under experienced men in what might be called the finishing process, and have it in the course of actual work in his chosen line, under every variety of conditions. It is impossible for him to get such training in any other way. He would become familiar with fog conditions in various regions, with altitudes and with take-offs and landing conditions on high altitude fields under difficult conditions. A school of this sort, we feel safe in saying, would receive the heartiest coöperation of all transport companies and would be welcomed by the Department of Commerce. "Experience is the best teacher" is trite but true. The low fatality rate on regularly flown air mail lines proves this. Some one of the transport companies surely will recognize this need, for such training as we mention is now unavailable. It would result in fewer accidents, better service and confidence. Only confidence will increase airline patronage.

## EXPORT TRENDS AND POSSIBILITIES

THE recent report of the Department of Commerce on American aeronautic exports for the first half of 1929 (summarized elsewhere in this issue) demands a thoughtful consideration by leaders of the industry of the trends of American aviation. This report shows that, with total aeronautical exports of \$5,174,656 for the period, as compared with \$3,664,733 for all of 1928, the present year's foreign trade will, at the same rate, increase to 282 per cent over last year's exports. Some of the significant markets with their purchases as shown by the report are as follows: airplanes, Mexico 62, Canada 44, Chili 32 and Argentina 11; aircraft engines, Germany 45, Poland 32, and Switzerland 1. United States exports of complete airplanes are close to 300 per cent higher than last year; exports of parts and accessories have increased 400 per cent.

From this report several facts appear clearly. In spite of circumstances existent in the other aircraft-producing countries which serve to stimulate their competition with this country in the world aeronautical market, American



engineering and production methods are gaining favor in the international trade competition. Most of the European producer nations are heavily indebted, and are making well-organized national efforts to further export trade. All of these countries have lower standards of living and lower wage costs. American products have penetrated those markets where their competitors have closer geographic and linguistic relationship; and, in the sale of engines, have entered the domestic markets of the foreign producers themselves.

The export activities, as shown in the semi-annual summary, indicate a healthy circulation in the organism of the American aeronautical interests. Export trade is a measure of the vitality of any industry; for it provides outlet when the stream of production becomes over-full, and it shows the extent to which universal requirements are being filled. Nevertheless there are a great many American aeronautical manufacturers who have not yet interested themselves in the advantages and possibilities of export business, and who have not availed themselves of the services of the Department of Commerce, now handled through the Aeronautics Trade Division. Products shipped abroad so far this year represent only 5 or 6 per cent of the production of the American industry; other industries export well over 12 per cent of their domestic production.

It is also evident that the vast foreign market has only begun to be tapped. The buyer countries, like all others, are continually using more planes, and are increasingly inclined to buy American products rather than some other. A good example of this is China, which only recently lifted its embargo against shipments of foreign planes, and which, so far this year, has bought sixteen American planes. Chili has only just begun an active participation in aeronautics, and the wealthy hinterland of the South American continent is untouched as an aircraft market. In the export trade, for several years at least, "the sky's the limit."

### THE SCHNEIDER CUP RACE

**I**F the United States has an entrant in the Schneider Cup races the credit will be due entirely to Admiral Moffett, Lieutenant Al Williams, and the Bureau of Aeronautics. If this country does not have an entrant, the lack may be attributed to those powers in our Navy who have fought aeronautics since its inception because of their justified fears that flying fighters will soon supplant sailors, to the embarrassment of the ancient order and the distress of the great manufacturers of armor plate.

A nation which can afford to spend billions on a Big Navy Program, known to everyone, including President Hoover, to be a tremendous waste, could easily afford to spend a few hundred thousands for a purpose as constructive as competition in the Schneider Cup Races.

If nothing more, participation in this contest would be an attempt to regain the honors in an art created by one of the nation's own distinguished sons. It would be patriotism. It would be the kind of sportsmanship our national pride demands and it would involve at least a fair chance of splendid victory.

Entirely aside from these things, the development of racing planes fit to compete could not fail to be of immense value to American aeronautics.

All these things have been known for a long time. Only Lieutenant Al Williams, and his earnest supporter, Admiral Moffett, have risen to the situation. Naval heads, on the other hand, because of their distaste for aviation, have

been willing to humiliate the nation by refusing funds to build a ship.

The coming Congress would do well to appropriate funds for the establishment of a national prize for manufacturers who have the nerve and the desire to enter in a competition for the building of an American entrant for the next Schneider race. An appropriation of half a million dollars would warrant manufacturers' undertaking to produce a worthy entrant for the great contest. This would take the whole thing from the Navy's hands.

Uncle Sam is not by nature niggardly. His stinginess in this matter casts no real discredit on America or on the industry; the real stain is on the Navy, but in the world's eyes all America is tarnished by the episode.

### "BILL" MAC CRACKEN

**B**ILL MAC CRACKEN has been touring Europe in the interests of American aviation. Wherever or whenever you may find him, he is always doing something in the interests of American aviation. We can rest assured that that which he has learned abroad on this trip will materially benefit our flying. He learns about the right things and he put them rightly at the disposition of the industry he loves and its supporters.

Before this page is printed we believe Bill MacCracken, to the great loss of the industry, will have resigned the governmental post which he has filled with such distinction for so long. It would be unreasonable to expect this brilliant lawyer perpetually to sacrifice his practice in his own profession to the development of American aviation, great as may be his love of flying and his patriotism.

But need the industry entirely lose him? Should not the Aeronautical Chamber of Commerce retain him as special counsel? To this advisory work, of course, he could not devote all his time; he will have many things to do in building the career which surely is before him. But the Chamber could get a part of his endeavor—and keep him closely linked with aviation.

With Fred Rentschler as President, and Bill as counselor, the Chamber would continue that rapid growth of membership and usefulness which has marked it during the last six months.

### THE DREAM HAS COME TRUE

**E**VEN we who are in the midst of it scarcely understand how great the actual accomplishments of American aviation have been. The American Air Transport Association calls attention to the fact that the United States now has 10,183 miles of air-routes, connecting it with sixteen foreign countries, with 13,000 miles more soon to open, linking us with ten other countries.

In greater detail the facts are: Central and South American routes at present extending from Miami, Florida, actually connect not only the United States, but Canada, with Cuba, the Bahamas, British Honduras, Honduras, Nicaragua, Costa Rica, Panama, Colombia, Venezuela, Ecuador, Peru, Hayti, Dominican Republic and Porto Rico. Other routes which are soon to be in operation will extend this tremendous network of airlines into Uruguay, Chili, Brazil and the Argentine. New York long has had air passenger service to Canada, and Detroit soon will have a line serving the Middle West with regularly scheduled transport flying to Toronto. Mexico is well linked with us by regular lines operating from Brownsville, Texas, to Tampico and Mexico City; between California airports and Tijuana service has been in regular operation for some time.



# MANUFACTURING NEW ENGINE MODELS

**F**EW persons, I believe, other than those who have actually engaged in designing and constructing aviation engines, have a clear conception of what it means to put new models into production. I hope, therefore, that those readers of this article who are in that position will be interested in learning the vast amount of detail that is necessary to accomplish such a thing.

First of all, and primarily responsible, are the engineering specifications, bills of material, and details covering the design of a complete engine. When the Engineering Department of the engine manufacturing company is convinced that the engine will function properly in service, and will meet all the requirements of the operators and airplane manufacturers, the blue prints, bills of material, and specifications are turned over to the Manufacturing Department with a formal release.

The Manufacturing Department then considers each detail of the engine and makes a complete study of every part to determine the operations necessary to convert rough stock into the finished parts, and to ascertain the proper sequence of these operations, so that each unit may be produced with the greatest degree of economy and accuracy.

At this point, it is very important that the several departments of the manufacturing organization function in unison. These departments are divided into two main classifications: the Production Engineering Division, which controls tool design, equipment and plant layout; and the Planning Division, which supervises the ordering, purchasing and storing of materials, and process follow-up.

The Tool Design Division designs such fixtures as may be necessary in the performance of each of the various operations required to bring the engine parts to the finished state. The number of fixtures required for the completion of a single part ranges from one to fifty. These tools are designed on the same basis as an engine; that is, a layout is made of every tool. The layout is then broken down to a detail of each and every separate part of the tool or fixture. Some of these details call for castings; others are made from bar stock. Whenever castings are necessary, a pattern is prepared from which the castings are made. These castings are then machined to the specific dimensions shown on the detail drawing. Parts to be made from bar stock or standard material are finished to the detail in the Tool Room. Orders for these tools are furnished to the Tool Room, with specific instructions for the quantity required and the date on which their completion is expected. When finished, the

By G. W. Vaughan  
Vice President and General Manager  
Wright Aeronautical Corporation

tools are submitted to an organized Tool Inspection Department, which in turn checks them against the detailed specifications and tests them thoroughly to determine if they will

properly machine the engine part for which they were designed and meet with the Production Inspector's approval of the particular part. If the tool passes inspection, it is then delivered to the Tool Crib; otherwise, it is returned to the Tool Room for correction.

While this is going on, the Plant Layout Department not only is making a study of the routings and drawings to determine the equipment and floor space required, but is supervising the location of equipment in the proper departments. This equipment is lined up in sequence of operations, as nearly as is practical, for progressive manufacture. Proper location of equipment is a very essential factor in the manufacture of a new product, because the moving of machinery after it is once located, anchored and powered is much more costly than proper original installation.

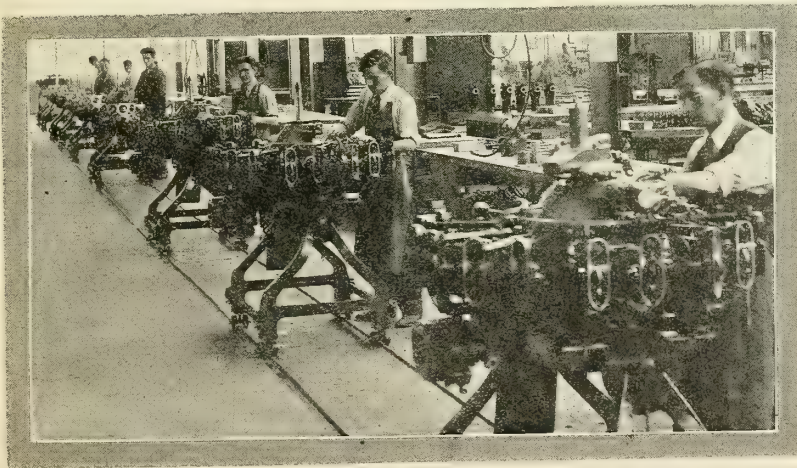
In addition to the various internal troubles which inevitably arise at this time as a result of the congestion generally existing in the Tool Department, there are also difficulties with outside vendors from whom is purchased machine tool equipment for performing operations on particular parts. Mistakes necessitating alterations and corrections, improvised methods and temporary tooling add further to the burden of non-productive labor, and to the cost of the product. The necessary additional clerical work involved introduces abnormal overhead expenses.

Moreover, delays caused by overloading certain equipment while other equipment stands idle necessitate overtime and result in costs greatly in excess of those of normal operation.

During the progress of the tool designing and plant layout, the Planning Division is tabulating its records, and the Ordering and

Purchasing Departments are sending out blue prints to vendors for quotations on quantity lots, etc.

While all this preparation is going on, the Engineering Department continues further tests with the engine, and generally discovers that both major and minor changes must be made. These troubles are corrected by changes in design or changes in material; and the Manufacturing Department, advised of these changes through the regular routine, checks them with fixtures already designed and being made to determine what changes, if any, may be necessary. Sometimes the alterations are minor; but at other times the whole fixture has to be re-designed in order to provide for the change. In such a case, the complete routine, as I have already outlined it, has to be re-



Progressive line of final assembly at the plant of the Wright Aeronautical Corp.



peated. And to do that is to disarrange the original schedule and, in many cases, postpone the date when regular production can begin.

One gathers some idea of the ratio of work to the number of parts when he realizes that, although there are a total of 434 part numbers on the Wright Whirlwind nine-cylinder 300 horsepower engine, there are 24,800 operation sheets to be written, 14,880 standards to be set for premium, and 8,680 individual fixtures to be designed and built and perfected to enable these 24,800 operations to be performed. In addition to this, there are 9,920 perishable tools, such as taps, dies, reamers, drills, etc., and 7,440 different gauges for the inspection of "Work in Process" and "Finished Parts" before they can be placed in finished stock.

The seven and five-cylinder engines are not in a direct ratio because of the fact that 94 per cent of the parts are interchangeable, but those parts which are not interchangeable are in approximately the same ratio and add somewhat to the number of tools.

In cases where new models are being put into production by an organization that has been functioning for a sufficient length of time to coördinate its routine, the task is somewhat simplified; but when it is to be done by a rather new or-

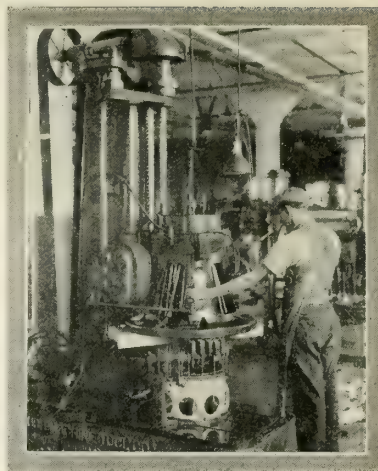
ganization, or one whose personnel has increased approximately 400 per cent in twelve months, the situation is considerably complicated from a production point of view.

The foregoing briefly describes the preparatory work of getting the plant ready for the manufacturing of new model engines. This leaves one with the impression that, although the job may not be difficult, there is a vast amount of work to be done before satisfactory production can begin. But there is more to it than that—for the role

of a most important department has yet to be explained.

The Management, in consultation with the Sales Director, gives the Manufacturing Department a formal release for the manufacture of a specified number of engines.

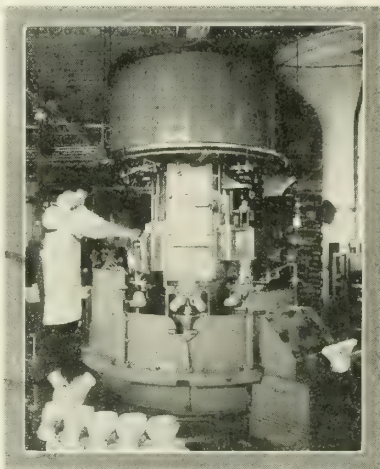
The Production of Materials Control Department, which is responsible for the scheduling of



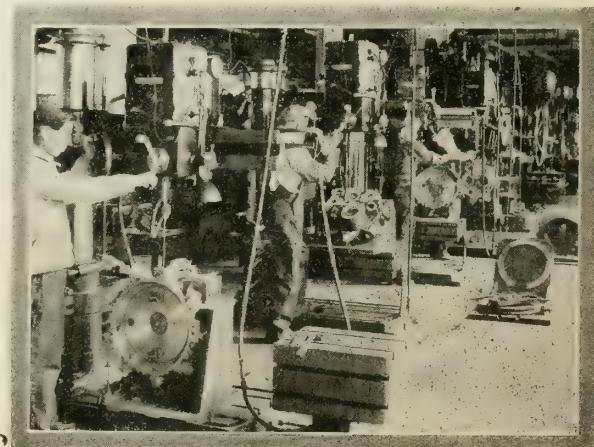
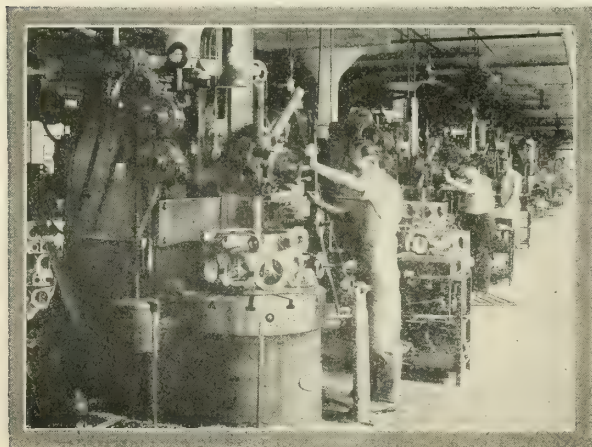
Drilling holes in the crankcase

production, then orders materials, issues work orders, expediting work from one department to another, and at the specified time brings to Finished Stock or Packing Room, completed units in quantities necessary to produce engines and spare parts in accordance with schedules published. It is necessary for this department to determine beforehand from its experience a sufficient surplus to cover a normal amount of scrap on the particular part in question. This scrap varies with the nature of the part.

Control boards are set up featuring amounts ordered, department to be processed in, and other steps necessary in order to fabricate the material. These boards also indicate what equipment is on hand to do the job and a loading plan for each piece of equipment, together with the necessary system to show the Production Control Supervisor exactly where material is in the shop at all times, in order that the foreman of the department may know when the particular material is needed and in what quantities. It is not uncommon to find that, with a schedule all set up and the machinery to carry the schedule through in operation, conditions have so changed with regard to sales requirements that a complete revision of the schedule becomes necessary. This revision must be accomplished at the earliest possible moment, and without confusion. The object of this department is to keep as low as possible inventories of raw material, work in process and finished stock, and to keep the factory working on an efficient basis by reducing to



Machining Wright cylinder heads



Machining and drilling operations on the crankcase of aircraft engines at the Wright factory

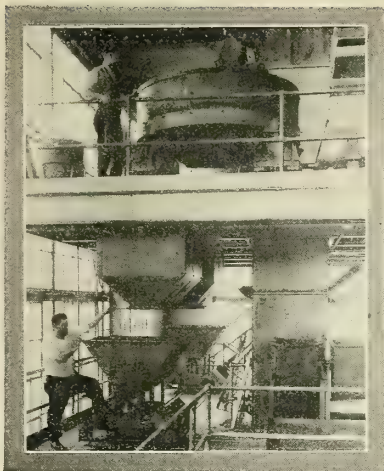


the lowest minimum such items as set-up time, overtime, etc.

I have often heard it said that the production of airplanes engines should be made comparable to the production of automobile engines. Insofar as production routine alone is concerned this, in a measure, can be done; but in such details as the purchase of material, the inspection and processing, the upkeep of tools, etc., aircraft engine manufacture is much more tedious and elaborate.

First of all, the factor of safety, from a stress analysis point of view, is exceedingly low as compared with any other type of internal combustion engine. Because the weight of the engine per horsepower must be as low as possible, this condition is unavoidable. To counteract this, it is necessary to eliminate even the slightest defects in any of the steel or other metal parts before they are assembled into a complete unit. The possibility of the existence of the slightest seam lap and non-metallic inclusions, too minute to be detected by the naked eye and small enough to be covered up completely by a grinding wheel or cutting tool, make it necessary for all parts to be lightly etched in order to bring out such minor defects. When such defects are encountered, the part involved is immediately scrapped. Nor can sharp corners be permitted, for in handling material in and out of the shop, these sharp corners are apt to receive a very slight nick. This nick would undoubtedly start a failure at some period during the life of the engine. The opportunity of their existence after an engine has been serviced is not by any means remote. It is essential, therefore, from a manufacturing and service viewpoint, to remove all sharp corners in the beginning and eliminate once and for all the possibility of failure from this source.

There are a great many procedures, too numerous to



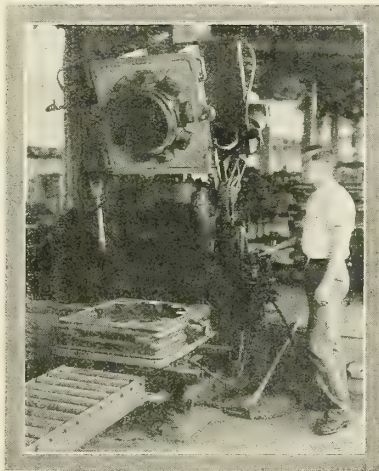
Conveying, mixing and loading core sand in pattern dept.

mention, yet quite interesting, which are essential to the successful manufacture of aviation engines, but which the layman who has had experience in building other types of engines would perhaps consider absurd because unnecessary. In the ten years we have been building aviation engines, however, we have learned a good deal, profiting by our own experience and taking advantage of the wonderful tools and equipment developed by the automobile industry, which have helped advance the airplane commercially several years.

Although airplane engines are not yet manufactured on a production basis equal to that in a big plant manufacturing automobile engines, there are many departments in our plant set up on a progressive line using conveyors to carry the parts from one operation to the other.

Because the material specifications of some of our important castings are special to our product, it has become desirable and necessary to set up our own foundry. In

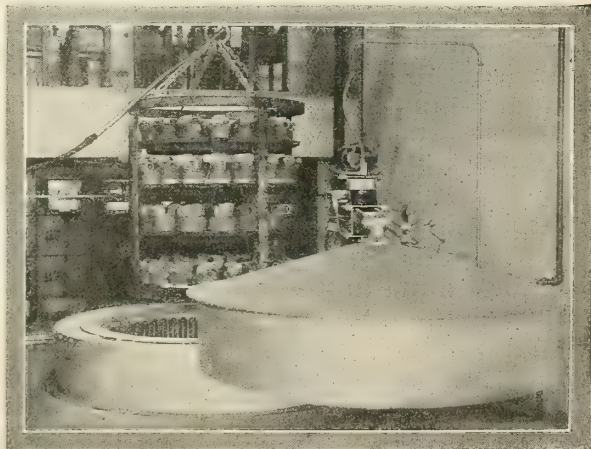
doing this, we endeavored to acquire the most modern and efficient foundry equipment. Through the use of sand mixing machines, we are able to obtain a uniform mixture of our core sand, which is later distributed to the workman's bench for molding and then placed on a cradle which carries it through a continuous type core oven.



Crankcase mould in the Wright foundry

Modern equipment is used to control the heat in the melting pots, so that the metal is poured at a specified temperature. With our heat-treating equipment, we are able to refine the metal grain and add a great deal more strength to the casting than is obtained in ordinary foundry practice.

Since most of our Machine Shop equipment is new, we naturally searched the market for tools that would give us the highest quality of workmanship. The number of



Left: A corner of the metal pattern room at the Wright plant. Right: Heat-treating cylinder heads in an electric furnace



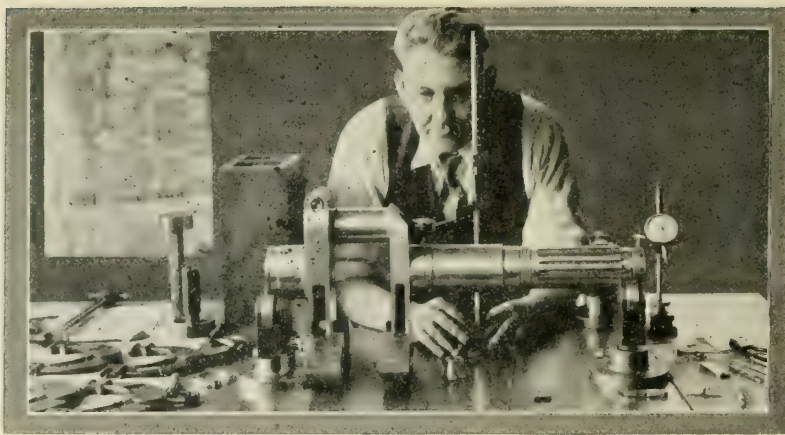
cylinders on our engines makes it essential that the combustion chambers in the cylinder heads be machined in uniformity.

The cylinder sleeve is made from a steel forging machined all over, after which the bore is ground and honed to a mirror-like finish. Because of the number of parts mounted to the crankcase, it is essential that the workmanship on this part be as near perfect as possible.

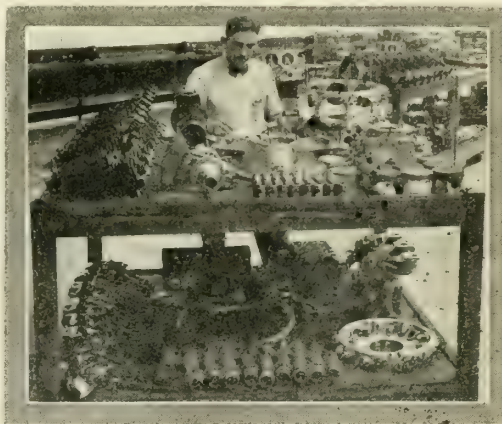
In our Assembly Department, we have adopted a progressive line-up similar to those used by other engine manufacturers of today. However, we go into the final operations in more detail than the makers of engines used for other purposes. After the first test, the engine is completely torn down and its parts are subjected to the most rigid inspection for cracks, wear, etc., which might have developed during this run and which would cause serious trouble if overlooked and not rectified at once. The engine is then reassembled and put on the stand for a final test before it is shipped to the customer.

There is, and always will be, a certain amount of the human element connected with engine building, and no human being is infallible. Nevertheless, it is a matter of record that, with the exception of an isolated case or two during the past year, we have not developed any defective material in service in the field. I do not mean to imply that we have perfected aviation engine construction, for there is still much to learn; but we can at least point with pride to the results we are now obtaining in this direction.

**T**HERE are three new Wright Whirlwind engines of the J-6 series having five, seven and nine cylinders respectively. They are radial engines with stationary cylinders and rotating crankshafts. All accessories



Crankshaft inspection on dimensions, splines, thread diameters, balance, etc.



Inspection of parts after the first block test



Testing the master rods of Wright J-6 and Cyclone engines

on these engines are at the rear, including the valve actuating push rods. This arrangement reduces the head resistance of the engine when in flight and permits of neat and simple cowling design. The accessories, such as magnetos, are also protected against rain, snow, ice and dust by this de-

sign. Each engine is provided with a front exhaust manifold of the collector ring type, and with a nose cowling with shutters operated from the pilot's seat. The movable shutters permit the flow of air around the crankcase and cylinders to be regulated so as to give the maximum engine efficiency under varying climatic conditions and atmospheric temperatures.

The crankcase assembly is composed of four major castings of aluminum alloy. The cam follower ring carrying the tappet guides is cast integral with the main section of this crankcase, giving support and lubrication to the tappets, and eliminating a number of detail parts with a consequent saving in weight. The rear section carries all accessory drives, comprising those for magnetos, oil and fuel pumps, generator and rotary induction system. The crankshaft is of the single-throw, two-piece type, made from alloy

steel forgings and counterbalanced to prevent vibration.

The cylinders are composed of a steel barrel over which an aluminum alloy head is screwed and shrunk. Each cylinder is attached to the crankcase by eight steel studs passing through the cylinder flange and has cooling fins

so arranged as to give efficient working temperatures under all conditions. The intake ports are at the rear of the cylinders with the exhaust ports on the forward side to obtain the most effective cooling.

Lubrication is provided by a pressure pump which carries oil to the front and rear of the hollow crankshaft.



# UNDERWRITING AVIATION INSURANCE

**"A**VIATION insurance rates will have to be reduced before I will insure my ships."

How often have we heard that? No doubt as time goes on the rates will be reduced, but only as a reflection of the gradual reduction of hazards, resulting from improvements in safety factors throughout the industry. As a matter of fact, the companies writing aircraft insurance,—a few companies with vision who have gambled against the future for the assistance of this growing industry,—have not made money. In fact, close examination of the loss ratios shows that they are dangerously disturbing.

With the requirements of the Department of Commerce more exacting, better and more airports and emergency fields, improved methods of wiring and construction of stacks on ships to eliminate fire hazards, better types of landing gears, increased experience of pilots, allowing a better selection of men for important flying jobs; improved power units, better designing of ships, increased lighting of airways, radio beacons, properly lighted ports, the tightening up of the organization and operating personnel, particularly of transport lines, and the refusal of insurance companies to insure any but completely equipped and operated companies,—there is a pronounced decrease in the number of accidents. In addition, those who carry insurance are contributing in that respect through inspection departments and recommendations.

As a matter of comparison, it might interest those in the industry to know how ordinary insurance rates are predicated and how very difficult it is to underwrite aviation risks.

Insurance is the collection of a little money from a lot of people to pay a lot of money to a few people. It is based on the law of probabilities. In figuring insurance rates on a given hazard, we must have a great content of experience. This experience is gathered by statisticians, and when turned over to the insurance actuaries in the rating bureaus, furnishes them information for making up what is known as "pure premium" and rates. Pure premium means that portion of every dollar which goes to pay losses. Assuming, for instance, that the pure premium of a certain type of insurance is 60c, meaning that we would pay out for losses 60c of each dollar collected, the 60c would then be "loaded" for "acquisition cost," which includes the commission to brokers and agents, expenses of special agents, taxes, home office overhead, inspections, etc., the total making up the dollar.

In order to secure this experience, applications for insurance go to a coding department which establishes certain code numbers for territory, for agency, for each different classification, etc. These reports are then turned over to a department which punches a statistical card so arranged that, by a selective machine, the premiums written for different kinds of risks, divided into different territories, agents and classes, are recorded.

The same system is used in making up statistics on losses, so that central rating bureaus, having accumulated statistics of the entire country from a large group of insurance carriers, can establish rates which are fairly accurate and, over a period of years, can amend these rates so that if the level of rates previously established is not sufficient to meet the loss, payments the base rates can be raised. There is no danger of over-charging, since the competition of other groups serves to stabilize the situation

By O. M. Doyle

*Second Vice President  
Independence Indemnity Co.*

so that the buying public can always secure insurance so close to the safety margin that the companies actually do not, as a rule, make any underwriting profit, but instead make an investment profit only on the temporary use of premium money which they invest.

Now when we come to the aircraft situation we have an entirely different proposition. We have several types of ships, variously motored and flown by different kinds of pilots, with different kinds of usage and over various kinds of terrain. For example, a certain type of ship, with certain equipment, might be highly efficient for low ceiling work but unsafe in mountainous country. The safety of aircraft operations varies widely under different conditions, depending upon personnel, equipment, navigation aids, servicing facilities, airway development, airports, emergency landing fields, etc.

Transport lines could never be given a rating classification as "transport lines," because all have different problems, travel over different kinds of terrain, on different schedules, with different equipment, different operating personnel and management. Some of the lines are models of near perfection, having regular overhauls under ideal repair and inspection conditions, having almost unlimited capital behind them for the purchase of modern equipment, having the most rigid and careful selection of pilots and mechanics under a management properly fitted to make such selection, and a form of discipline which keeps the men continually alert and wide awake. Other transport lines do not match up to these requirements.

A well-known underwriter recently stated, as his opinion, that there were over 400 different factors to take into consideration in the handling of aircraft risks. When we couple this with the understanding that statistics, up to the present, have not been gathered in a standardized manner, except by the insurance carriers themselves, it is easier to understand the difficulties faced in securing commensurate premiums properly to take care of the hazards. However, much preliminary work has been done and certain principles are being established and the carriers are learning just as rapidly as are the operators, that problems must be met and gradually overcome, but it will be a long time, if ever, before insurance of aircraft will be brought down to the routine basis used in other forms of insurance. The judgment of the underwriter, based on the advice of his engineers, will continue to have a bearing on each situation.

The common law status of many phases of the industry has not yet been definitely settled by the Courts, but many of the states have passed, or are preparing to pass, statutes defining the liability of operators. Uniform state laws, as well as the Air Commerce Act, have had a good deal to do with the situation, and the closer the operators in the different communities keep their legislatures to the uniform law and the licensing requirements parallel with the federal law, the better for all concerned.

Insurance protection is readily available to those interested in aviation and is exceptionally comprehensive. It is possible to cover the individuals themselves for life and accident insurance, to cover the cargo against the various perils of transportation, to cover aircraft against the hazards of fire, theft, wind storm and crash. Passengers can be accommodated with trip ticket policies similar to railroad accident policies. (Continued on page 358)



# ORGANIZATION AND TRAINING IN NAVAL AVIATION

PRIOR to the World War, naval aviation

activities were decidedly limited and their application to fleet work was practically nil. The pioneers—Mustin, Towers, Ely, Billingsley, Richardson, Rodgers and others—were chiefly concerned with beating the bumps and even a short flight was an event. With inadequate and primitive material, often repaired at their own expense, these officers succeeded, however, in awakening the Navy to the possibilities of aircraft as an arm and auxiliary of the fleet. It is indeed remarkable that they foresaw so clearly the fundamentals of current naval aircraft operation and that their attention turned to the fore-runners of present day catapults and carriers while airplanes themselves were still highly experimental. Long before the war, landings and take-offs had been made on the old armored cruiser *Pennsylvania* (now *Pittsburgh*), utilizing a crude arresting gear; catapult experiments had clearly indicated future possibilities, and the cruiser *North Carolina* had been fitted to carry and operate a number of seaplanes.

With the entry of the United States into the war, experimental work largely stopped. The Navy was assigned certain tasks to perform, and every possible effort was of necessity directed towards their execution. The expansion in personnel and material was rapid and tremendous. Starting from a single small air station—Pensacola—training of large numbers of pilots was carried out there and at the Massachusetts Institute of Technology (ground school) and at Bay Shore, L. I., Parris Island, Miami, Key West and San Diego. When the armistice was signed, over two thousand naval aviators had been designated. Aviation mechanics were trained at Great Lakes and at Dunwoodie Institute. Coastal patrol stations were operated at Squantum, Rockaway, Norfolk, Cape May, Coco Solo, Pearl Harbor, T. H.; Morehead City, N. C.; and Brunswick, Ga. Naval air activities abroad were widespread and comprehensive. Training was conducted at Mouchie, France, and at Lake Balsino, Italy, and in addition the facilities of certain French, English and Italian training schools were utilized. Coastal patrol stations were operated at Arcachon, Guipavas, Ile Tudy, La Pallice, L'Aber Vrac, Treguenier, Frontentine, San Trojan, and Le Croisic in France, at

By Lieut. Commander F. W. Wead, U.S.N.  
and Captain W. H. Sitz, U.S.M.C.

Killingholme in England, and at Whiddy Island, Lough Foyle, Wexford and

Queenstown in Ireland. These units were primarily engaged in convoying surface craft with seaplanes and blimps and in operating against German submarines. Large assembly and repair depots were established in Brest and Paulliac in France, and at Eastleigh in England. The Northern Bombing Group, based at Dunkirk, conducted many raids into Germany, and naval seaplane squadrons based at Porto Corsini, Italy, saw much active service against Austrian aircraft and submarines. In addition, naval personnel was frequently assigned to Felixstowe and other stations under Allied command in seaplane and land-plane units of all sorts and description.

Unquestionably the war advanced all phases of aviation to a point which years of peace-time effort might not have reached. It is fortunate that, in the post-war deflation, the Navy managed to retain a majority of war facilities

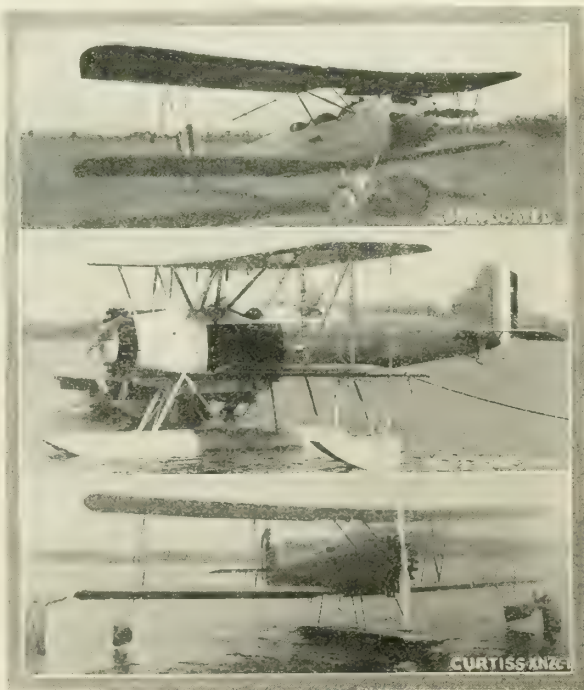
essential to a rapid and proper development of fleet aviation. Prior to 1921 all aircraft activities were handled by a Director of Naval Aviation and the various materiel and personnel operating problems were parcelled out among the different bureaus and other existing agencies of the Navy Department. Under such a system smooth co-ordination and effective control were difficult, and as a result the Bureau of Aeronautics was established by law and was first organized in 1921 with Admiral W. A. Moffett as Chief and with the late Captain Henry C. Mustin as Assistant Chief.

The Bureau of Aeronautics is by law a materiel bureau. It is fortunate, however, that experienced aviators attached thereto have been able to exert considerable influence in regard to personnel training and operating policies and in laying out plans for the

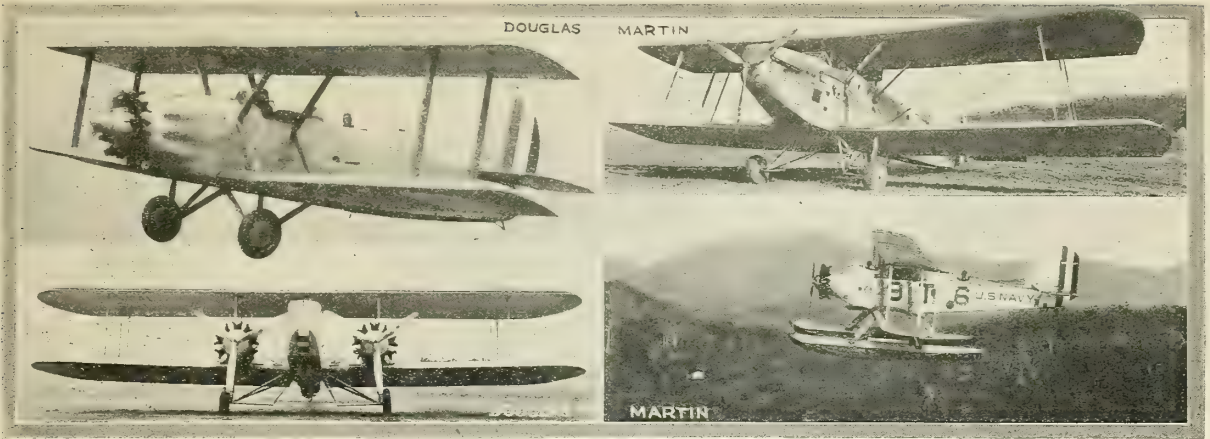
future—matters which by law fall under the cognizance of other bureaus of the Navy Department.

## Fleet Organization

In later years the one primary function of naval aviation has been to serve and increase the fighting power of our fleet, and all plans and progress have been made with this end in view. The two major fleet aircraft organizations are the Aircraft Squadrons, Battle Fleet, in the Pacific, and



Navy training planes for both land and water operations



Single and twin-engined Navy bombing planes equipped to operate from land and water bases

the Aircraft Squadrons, Scouting Fleet, in the Atlantic. There is also the Aircraft Squadrons, Asiatic Fleet, consisting of the *Jason*, tender, with one torpedo and bombing plane squadron which is likewise utilized for various other aircraft functions in Asiatic waters.

The Aircraft Squadrons, Battle Fleet, consists of three observation plane squadrons based aboard the battleships U.S.S. *New York*, U.S.S. *New Mexico* and U.S.S. *West Virginia*; two torpedo and bombing squadrons, one attached to the U.S.S. *Lexington* and one to the U.S.S. *Saratoga*; two fighting squadrons, one attached to the *Saratoga* and the other to the U.S.S. *Langley*; four scouting squadrons, attached to the *Langley*, *Saratoga*, *Lexington*, and U.S.S. *Omaha*, respectively; and a utility squadron based at the Naval Air Station, San Diego, California. There are also two tenders attached to the Battle Fleet, the U.S.S. *Aroostook* and the U.S.S. *Gannett*.

The Aircraft Squadrons, Scouting Fleet, consists of one torpedo and bombing squadron attached to the tender U.S.S. *Wright*, one observation squadron aboard the U.S.S. *Arkansas*, a scouting squadron attached to the U.S.S. *Richmond*, and a utility squadron which is also attached to the *Wright*. The U.S.S. *Patoka*, U.S.S. *Sandpiper*, and U.S.S. *Teal* are the tenders for the Scouting Fleet.

Each aircraft squadron is an independent command similar to a ship. Each fleet aircraft organization is commanded by a Force Commander designated as Commander, Aircraft Squadrons (Battle Fleet or Scouting Fleet). All aircraft operations and planning are under his cognizance, and units based on combatant ships are placed directly under his command at certain periods of the year for training and for coöperative work with other squadrons.

#### Shore Organization

The active shore establishment of naval aviation consists of the office of the Assistant Secretary of the Navy for Aeronautics; the Bureau of Aeronautics; the Naval Aircraft Factory at Philadelphia for experimental production; the Naval Air Station at Anacostia, D. C., for flight tests and experiments; the Aviation Mechanics School at Great Lakes; the Naval Air Station at Pensacola for flight training; and

Fleet Aircraft Bases and Coastal Patrol Stations at Hampton Roads, Coco Solo, San Diego and Pearl Harbor. The Aircraft Engine Laboratory is maintained as a part of the Naval Aircraft Factory, and at each civilian factory doing naval work an Inspector of Naval Aircraft is on duty. Experimental ordnance and torpedo details are maintained at Dahlgren and Newport, respectively. In addition, Naval Reserve Training Stations are operating at Squantum, Great Lakes, Philadelphia and Seattle, and a naval aviator is detailed to the Bureaus of Navigation, Ordnance and Engineering, the Hydrographic Office of the Navy Department, and the Naval Observatory, Washington, D. C. All lighter-than-air activities are concentrated at Lakehurst. Other war-



Sea, land and amphibian observation planes of the Navy

time Naval Air Stations have been abandoned or are in an inoperative status.

General orders issued by the War and Navy Departments set forth clearly the somewhat overlapping functions of Army and Navy aircraft based ashore, and provide a policy for coöperation in case our coast should be threatened. Briefly, the Army is charged with those matters pertaining strictly to coast defense, while Naval Air Stations are charged with those matters pertaining to and



connecting with the operations of surface craft. It must not be forgotten that the primary mission of naval aviation lies in operating with the fleet at sea.

Although catapults are unquestionably the quickest method of getting aircraft actually aloft, and although they will always serve to carry airplanes for which carrier capacity does not exist, they are also subject to the limitations of rough weather, introduce a complicated refueling problem, and may hamper their ships in their major function. Every fleet airplane should be on the carrier.

It is probable that the future will see a considerable change in the organization of aircraft units within the fleet. In England the tendency appears to be to operate all carriers together as a squadron rather than to assign them as a part of some major fleet subdivision which the aircraft on board may happen to serve. It would appear that this method insures proper coordination between the various aircraft units, as, for example, between spotters and their protecting fighters, and it is certainly conducive to more thorough training, indoctrination and planning under a single directing head.

#### Training

Naval officers are selected for aviation training after they have had at least two years' duty at sea on a cruising ship, and upon their own request, provided that they pass a rigid physical examination. The prescribed age limit of twenty-eight years has been recently set aside temporarily in an effort to obtain more pilots and to overcome a personnel shortage which becomes more acute each year in the face of a program involving considerable annual expansion. Enlisted pilots are also selected from physically qualified applicants, selection being based primarily upon their record for efficiency in the service and upon the comparative recommendations of their various commanding officers. Enlisted pilots are

used where practicable in naval aviation to fill vacancies in commissioned personnel, and at present, are also being employed in a fighting plane squadron in the Aircraft Squadrons, Battle Fleet.

All elementary flight training is conducted at the Naval Air Station, Pensacola, Florida. Twelve classes were sent there this year and trained as naval aviators, about 50 per cent of the students finally completing the course. Of the members of these classes, six were enlisted men. Flight training and ground school interlock throughout the course.

Primary seaplane instruction is given in NY-2s (Consolidated), followed by flight, gunnery and bombing instruction in O2Us (Vought), and later by flight, navigation, radio and bombing instruction in O2Us, including several long flights at sea. After the seaplane course is completed,

primary landplane instruction is given in NY-1s, after which the students are divided into smaller classes and selected for specialized training in observation, fighting, and torpedo planes. The observation course consists of formation flying, radio and the actual spotting of gunfire from a shore battery. The fighting plane course consists

of formation flying, some fixed-gun work and a study of fighting tactics. In the torpedo plane school, torpedoes are overhauled and adjusted, and a few dummy and live torpedo drops are made. In the scouting class, radio, navigation and scouting problems are specialized in. The entire course is normally completed in about one year, and students are sent to the fleet

with over two hundred flying hours to their credit. In primary training, students who do not solo in ten hours are dropped. Instructors take their students through the entire course, and the progress of their students and the efficiency of their methods are frequently checked by the chief instructor.

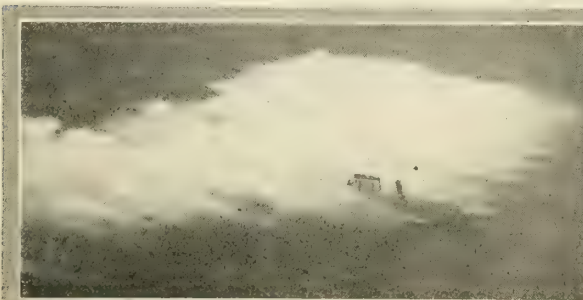
Ground school subjects consist of structure and rigging,



"Los Angeles" approaching mooring mast



Single-engine and trimotored Navy transport monoplanes



Left: the aircraft carrier U. S. S. "Saratoga" emerging from a smoke screen; right: the "Los Angeles" moored to a surface ship



theory of flight, engines, instruments, aviation seamanship, gunnery (including an extensive range course), bombing radio, tactics and other subjects particularly applicable to naval aviation. Students are required to send and receive radio at a rate of twenty words per minute, and to do a great deal of upkeep and practical work on airplanes and engines.

Naval aviation observers are required to complete all the ground and air work as outlined above for naval aviators, except that they do not solo. This designation has been limited to a few older officers in administrative positions.

#### Fleet Training

Pilots assigned to catapult squadrons are given instruction in the care and operation of catapults at the Naval Aircraft Factory or at the Naval Air Station, San Diego, before they are sent to their ships. Fleet aviation develops with astonishing rapidity. Each year new methods are tried out and discarded or adopted. As a result all of naval aviation is at all times more or less in a status of training and development. During the first year in any organization, new pilots should be under training. They are, however, usually assigned to a regular flight station in the squadron and their duties are shifted from time to time in order to give them a brief experience in the various squadron departments.

#### Naval Academy Training

In 1924 the Navy Department decided that it was essential that a more thorough knowledge of aviation be disseminated throughout the service. With this in view, aviation questions were added to the examinations for promotion for all officers and the courses of instruction at the Naval Academy were enlarged to include all fundamental aviation subjects. Classroom instruction is given in theory of flight, tactics and the like; and some practical work with radio and gunnery materiel and engines is also included. Upon graduation, newly-commissioned ensigns are sent in classes of twenty-five each to the Naval Air Station at Hampton Roads or at San Diego, for one month, where they receive a considerable amount of passenger time, including some dual flight instruction and actual gunnery, bombing, radio and navigation work. This instruction has served its purpose admirably, but it in no way solves the existing shortage in naval aviators. On the

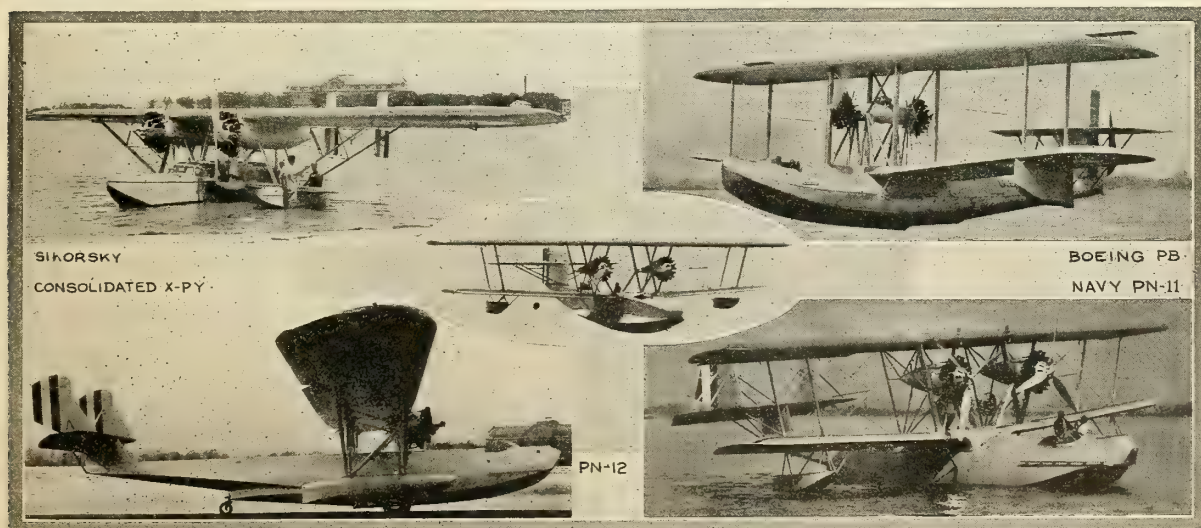
other hand, it has clearly confirmed past estimates that out of each Naval Academy class only 50 per cent are physically qualified for flight training and only 25 per cent are suitable naval aviator material. It is evident, however, that this training should ultimately lessen the load placed upon Pensacola and should decrease the percentage of failures there, inasmuch as students will approach flight training with a background of knowledge and with greater confidence in their ability to qualify, while those who are not confident and who are not interested in aviation work will not apply for training.

A greater knowledge of aviation materiel and methods throughout the service is not only desirable from a standpoint of having a thorough and widespread understanding of its problems and limitations, but also as an aid in the growth of our newest fleet arm as its value becomes more clearly comprehended.

In each naval district, naval reserve officers and men are grouped into an aviation division and, when practicable, drills and instruction periods are held at regular intervals. These individuals are upon their own request ordered to fifteen days active duty for training each year, usually to the nearest Naval Air Station or squadron.

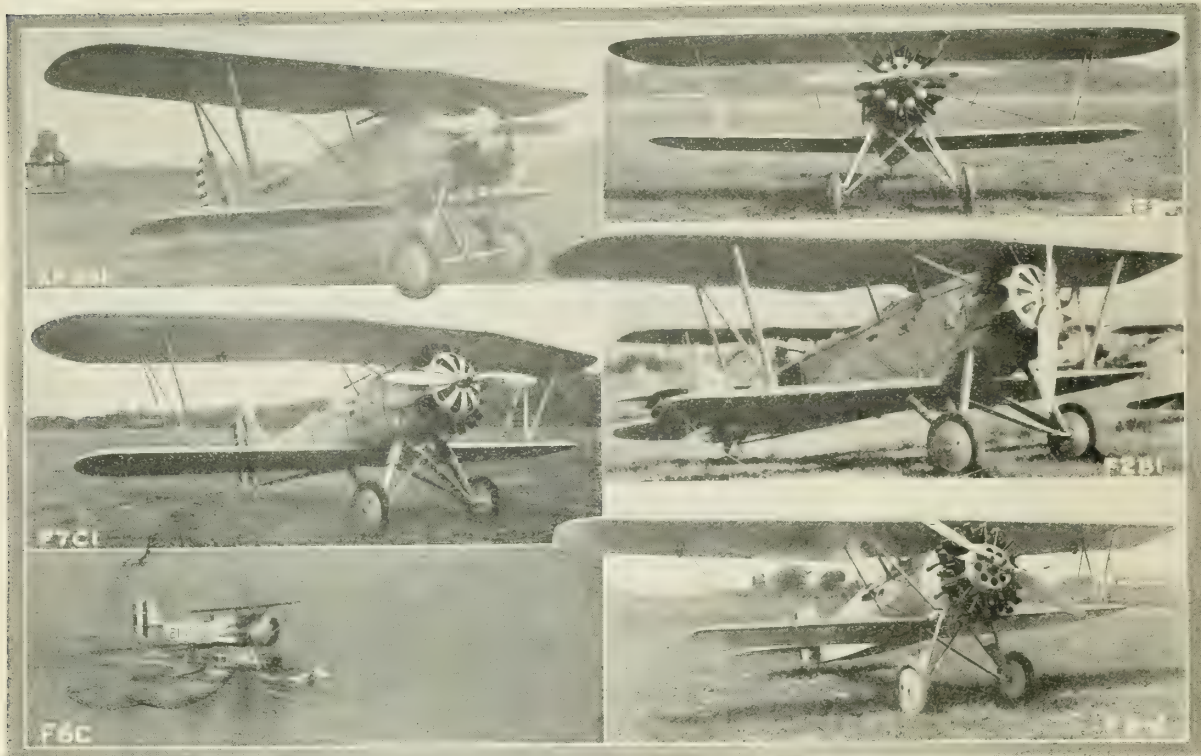
In order to maintain a flow of younger reserve pilots, a Reserve Training Station is operated at Great Lakes, and Reserve Aviation Bases at Squantum, Philadelphia, Detroit, Minneapolis, Long Beach, Calif., and Seattle, Washington. Two regular or reserve officers and about eight enlisted men are assigned to permanent active duty at these stations, which normally operate four training planes each. Students are enlisted as seaman, second class, U.S.N.R.F. Ground school subjects are covered during the first winter, followed by flight instruction during the summer months.

The following winter is also devoted to ground school; and during the second summer, students are sent to San Diego or Hampton Roads for advanced flight training in gunnery, bombing, etc. The young men taking this course are usually college students who can afford to devote their summers entirely to training. The Pensacola syllabus is followed as closely as possible; and upon completion of the course, students are designated as naval aviators and commissioned as ensigns, U.S.N.R. Each reserve station or base endeavors to train about twenty students a year. The bulk of the personnel in the Naval Reserve Force



Twin-engine flying boats and amphibions used in the Naval Air Service for patrol work





Boeing and Curtiss pursuit airplanes, all equipped with air-cooled Pratt & Whitney and Wright engines

consists of war-time officers and men who have severed their connection with the regular establishment. In addition to the training outlined above, the Navy also endeavors to commission qualified civilian pilots in the Naval Reserve and to send them annually to active duty for training for a short period when they so request.

#### Post-Graduate Training

The Navy selects each year a few experienced pilots for post-graduate work in aeronautical engineering. This course consists of one year at the Naval Academy in advanced mathematics and other fundamentals, followed by a year at the Massachusetts Institute of Technology in aircraft and engine design. Upon completion of this instruction, the pilots spend a short period of time at the Naval Aircraft Factory on practical work, followed by visits to various factories engaged in aircraft or engine construction for the Navy.

Although these officers cannot devote their lives to design work—a procedure which seems essential if a high degree of skill is to be obtained—they do gain sufficient knowledge and experience to approach operating and materiel problems from a design standpoint, and hence tend to shorten the gap which invariably exists between those who design and build aircraft and those who operate them.

### MODEL DESIGNATION OF NAVAL AIRPLANES

**N**AVAL airplanes are grouped into nine classes in accordance with the mission to be performed. Each class is designated in accordance with the following: (Type) Bombing, designation, VB; Fighting—VF; Ambulance—VH; General utility—VJ; Training—VN;

Observation—VO; Patrol—VP; Scouting—VS; Torpedo—VT.

The letter "V" signifies a heavier-than-air craft and "Z" signifies a lighter-than-air craft. This letter is omitted in the designations of individual models of the various classes of airplanes, but is employed in official correspondence relative to classes of airplanes, naming of airplane squadrons, etc. When an airplane performs functions of more than one class, the primary function determines its class designation. Present practice is to designate airplanes by a group of letters and numbers. This consists first of a letter indicating the class, second, a number indicating the model and third, a letter indicating the manufacturer, followed by a dash and a number indicating the modification of the model.

In the designation of the first model, the first number (1) is omitted. Thus the Boeing company's first training plane is the NB-1. When a major alteration, not of a character to change the model, was made in the NB-1, the modified plane was the NB-2. A second modification of the first model would be the NB-3. A second training plane built by this company would be the N2B-1. Similarly the first modification of the N2B-1 would be the N2B-2, and the succeeding modifications would be the N2B-3, etc.

The designation of airplanes of an experimental design is prefixed by the letter "X". Airplanes so designated retain the prefix while in service in order to indicate that such airplanes were the first of that experimental design series. XF2B-1 indicates that such an airplane is the first of a new series of experimental fighters manufactured by the Boeing Airplane Company, although this design is the second fighter design to be adopted by the Navy. When the new airplane design is accepted for service use and put into production, the prefix in the designation is dropped. (Continued on page 316)



# PERSONALITIES



by Caldwell

WITH all that is written about the men who are making aviation history today, we are apt to forget the old-timers who took the first steps. How many of you remember Tony Janus and his brother Roger, both killed during the war? They were fine boys. I wonder what they'd think if they could see what we are doing now. I wonder what they'd think of the Loening amphibian I am flying just now, compared to the old Benoist pusher, photograph of which is reproduced here, and which Roger crashed in the Detroit River on the 24th of May, 1916, in the same spot over which I am today flying Loenings, for the Thompson Aeronautical Corp'n, with the aid of Wright Cyclones of 525 horsepower. Roger was making an experimental flight in that old crate, with a "Maximotor," whatever that was. Probably pretty crude. And with D. M. Parker, from whom I have this picture and an old clipping, I learn what occurred.

"Aviator Saw River Coming To Give Him Mighty Hard Bump!" exclaims the Detroit Free Press of May 24, 1916. "Hundreds saw airman and two passengers driven into water by gravity and tremendous power of propeller. Three fliers hurt." But not badly, I hasten to add. And the tremendous power of the propeller was gained from some 60 odd toiling horsepower. So I guess gravity did most of the damage. It usually does, even to this day and date. The clipping says: "Speeding along at 60 miles an hour the flying boat attracted the attention of hundreds. Suddenly the flier sagged toward the river, then shot upward at tremendous speed"—the aforesaid 60 being the speed—"and as suddenly darted downward, striking the water. Some women shrieked and men paled as the waters closed over the three men, a great mass of spray hiding all. The aviator did not dare stop the motor until he was actually submerged, as he believed there was a chance to save his companions and himself." It occurs to me at this point that Roger needn't have troubled

to shut off the motor when he was actually under water—old H<sub>2</sub>O would see to that personally. But probably Roger hadn't studied chemistry. The reporter, highly wrought up, continues: "His foot was on the accelerator when he struck, and the mighty propeller was whirling at full speed." Whatever aviation was at that date, you will observe, reporters were then and now ever the same. But I question the mightiness of a propeller being whirled by 60 horsepower.

D. M. Parker, now a general merchant at Wolf Hole, Arizona, P.O. St. George, Utah, (if any of you old-timers know him, drop him a line and cheer him up) used to help Tony and Roger in their early work. After he crashed at Detroit with Roger he moved West to recuperate, and stayed there. I don't blame him for staying there—Arizona is a wonderful state. In 1928 Parker attended the show at Los Angeles, and saw the first airplane he had seen since 1916. Can you imagine that? What a place Wolf Hole must be. Poor old Parker, the original Godunk of 1916, for he used to ride free even then, rubbed his eyes at what he saw. And he bought a copy of AERO DIGEST and learned all the rest. He must have felt like Rip Van Winkle, this amiable Godunk who used to help Roger and Tony build airplanes.

I asked Parker, when he wrote to me, to tell me something about the Janus boys. "Roger and Tony," he writes, "were left orphans at an early age and adopted by a Washington, D. C., family whose name I never heard. Tony was associated with Tom Benoist in St. Louis in the early days and took part in a flying boat cruise on the Ohio River and later went to St. Petersburg, Florida, with Benoist as pilot of one of his boats powered with a Roberts six-cylinder motor." (I know the wretched thing well. In 1915 I had one of them, a two-cycle affair it was, in a Curtiss Model B. It had two speeds: full out and stopped. Usually it preferred the latter.)

Parker went with Tony Janus to Ft. Madison, Iowa, where they built a set of wings for a Benoist boat—neither of them knowing much about wings—and then went to Brunswick, Georgia, later the scene of Paul Redfern's ill-fated expedition to Buenos Aires. (Folks, when you talk of early days in this business—and it's a business now—you talk of sacrifice and hard times and death. I think we forget that today when we sail forth so confidently with our modern equipment. Let's think occasionally of the old boys who got us where we are at present. They all did their part.)

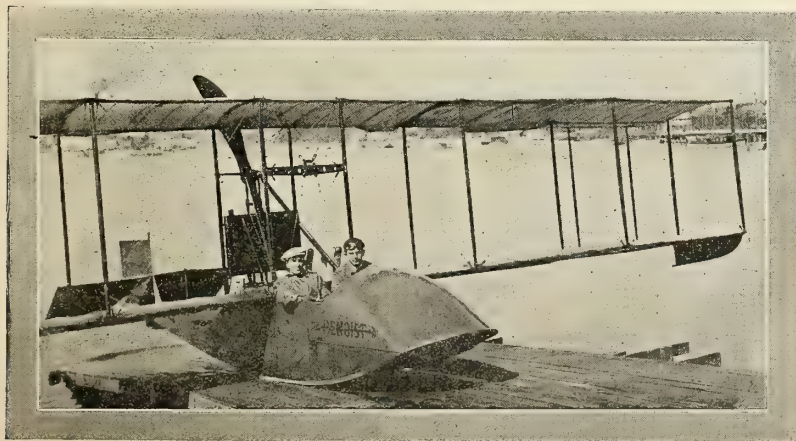
Later on, Parker tells me, Tony and F. E. Ericson—is that my old pal Commodore Ericson of Toronto? I think it must be. Drop me a line, Commodore—and are you still delivering champagne in the morning to the tired pilots?) Tony and Ericson built what they called the "Exposition Model" (That *must* be the old Commodore!) You know, I feel like an antiquarian delving into accounts of the Ark's progress when I write about the Commodore.

But I mustn't make this too long. I must close this account, and I hate to, for I must write of the passing of two boys whom I would give much to have with us today, when aviation amounts to something, which it did not at that time. Roger was killed in England, testing a Curtiss boat for the British government; and Tony lost his life testing a boat for the Russian government. They gave their lives for that thing we call "Progress In Aviation." Some night, when we folks at the Quiet Birdmen are meeting, let us raise our glasses and give this toast: "To Tony and Roger Janus, pioneers in aviation."



IF brevity is the soul of wit, the wit prize goes to William A. Frye, Captain, Air Reserve, U. S. A., who deposes as follows, to wit: "Born July 6, 1897. Pittsburgh, Pa. Saw Paulhan, Hoxie, Willard, do their stuff in 1910-12. So became interested. Entered Army July, 1917. Trained Rockwell. Instructed at Park Field 1918. One time member of S. O. S., A. E. F., for some months. Same old racket—teaching the young idea. Married in 1918. Have four

(Continued on next page)



D. M. Parker and Tony Janus in their old Benoist pusher flying boat



(PersonAIRlities Continued)

children—two boys and two girls. Have had command of 478th Pursuit Squadron, 322nd Pursuit Group, Organized Reserves, U. S. Army. Hq. Clover Field, from 1922 to date. Am now Supt. of operations for Pickwick Airways, Inc., Los Angeles. More or less truthfully, William A. Frye."

MY correspondent in Hertford, N. C., is Billy Crawford, fourteen-year-old son of the late Captain L. R. Crawford, U. S. Army Air Service, whom some



Billy Crawford

of you will remember at Kelly Field. I want to say a few words about Billy before I startle an anxious world with his news of Raleigh and the disaster that overtook that renowned city's aerial activities on Poindexter Field. Billy seems to be on the way to becoming a mechanical genius, for he has already invented several radio gadgets, about which I know nothing, and was recommended as the North Carolina appointee for the Thomas A. Edison scholarship. He was ruled out only because he had not completed high school—he's only fourteen. Remember that when you read his biography and news. I just wish that some of our Congressmen had Billy's sense of humor—we wouldn't have some of the funny laws we write under. But here's Billy himself, broadcasting on a wave length guaranteed to reach our most distant reader, whom I believe at the present is Art Caperton, over in China.

"September 6, 1914, I made a three-point landing on this earth. I don't remember much of my early life, but I was too young to get in the war, so didn't have to make up excuses like some of the older birds. Since daddy's death I have been going to school in Hertford, N. C., have been studying correspondence courses and anything I can find about airplanes. I have two more years in high school and then I plan to go to Brooks Field and later work for some transport company as a pilot. At present I am working on an invention for changing motors in the air." (Work hard on that one, Billy—Uncle Cy has often wished to trade in his old motor for a new one at the exact moment it stopped over a mountain. If you can just work out a scheme for having a section of the Wright factory suspended over the Alleghenies Uncle will be greatly obliged to you.) "I have been writing an editorial column for a newspaper and doing a little bit of everything. I have built six radios. I have built a scale model of a DH, but my sister sat on it and wrecked it. She is four years older than I am but I don't care—a Vought can outmaneuver a Ford, so us little fellows are not so bad!

"Say, Uncle Cy, Poindexter Field has gone to the dogs. The only regular occupant is Rex, a little German police pup. He is pretty small—I think he must be in the secret service—he's too small to be a regular patrolman. Pilots may come and pilots may go, but Rex stays at the field forever. Thursday an Eaglerock went in a spin and hit the ground. The wreckage would make J. Don tear his hair. Well, Rex was nonchalant—he lit a Murad. Yesterday the old hangar collapsed, I believe because a center brace had been removed. Rex merely grinned. You simply can't ruffle that small dog, Uncle Cy—he has the *sang froid* of two Admirals and a Major General. Yours with a smile—(Alexander doesn't have a patent on that, does he?) Billy Crawford."

THE gentleman whose photograph accompanies this veracious biography is not, as you might suppose, a well-known cloak and suit salesman from New York.

but Captain Frank T. Courtney, whose bold attempt to span the Atlantic in a flying boat last year ended 680 miles off Newfoundland when the boat caught fire, owing to a broken gas line. His escape and that of his companions was remarkable and fortunate. If he hadn't escaped he would not now be technical aviation adviser to Hayden, Stone & Co., but would be acting in an advisory capacity to old Charon, who runs the ferry-boat across the Styx. Courtney, I believe, is the gent who tells Hayden Stone what stock to sell to the customers and what stock to keep for themselves. I imagine that's what a technical adviser to a financial house does.

If you are one of those Americans who labor under the delusion that nothing is funny to an Englishman, read his recent letter to me. "Today I got my Transport Pilot's License, so I can now drive people either round, or mad, by air. By the same mail I got my car-driving license. I only want a pile-driving license to become a really licentious driver. I read about the new dry drive in Detroit. I don't see how they can leave anti-aircraft guns out of the enforcement equipment. Tell me what is doing on the Northern Front. If I can give any help against the enemy bottle-planes all I demand is that I may keep the bottles. I can't see this anti-beer business being carried far in Detroit without you being mixed up in it. I hereby offer to bale you out in case of trouble. I have been wondering if you were going to write up our great adventure, 'Lost in a Loening' or 'Waiting for Amelia.' Hooray! Likewise Bung-Ho! Frank T. Courtney."



Capt. Frank Courtney

This old bird and I sat in a Loening, bobbing about on the waters of the Detroit River, for some three hours waiting for Ralph Devore and Amelia Earhart to arrive from Cleveland in a Loening on the start of the Thompson Aeronautical Corporation's line from Cleveland to Detroit, with which I am toying at the moment. It was a wretched foggy day, quite hopeless for flying, and Courtney—who was to fly the return plane—and I sat there, cold, glum, miserable, making bets of bottles of beer as to when the long-awaited aerial jilloppie would arrive. The only trouble was that neither could pay his bet, as we had no beer, only an unquenchable thirst. So we sat and told each other lies about the old days, and passed the time until Amelia finally flew in. She had been down in a fog on Lake Erie, with a party of six, most of whom had been seasick. Amelia, it is almost needless to add, was quite unconcerned, and quite un-seasick. She's quite a girl.

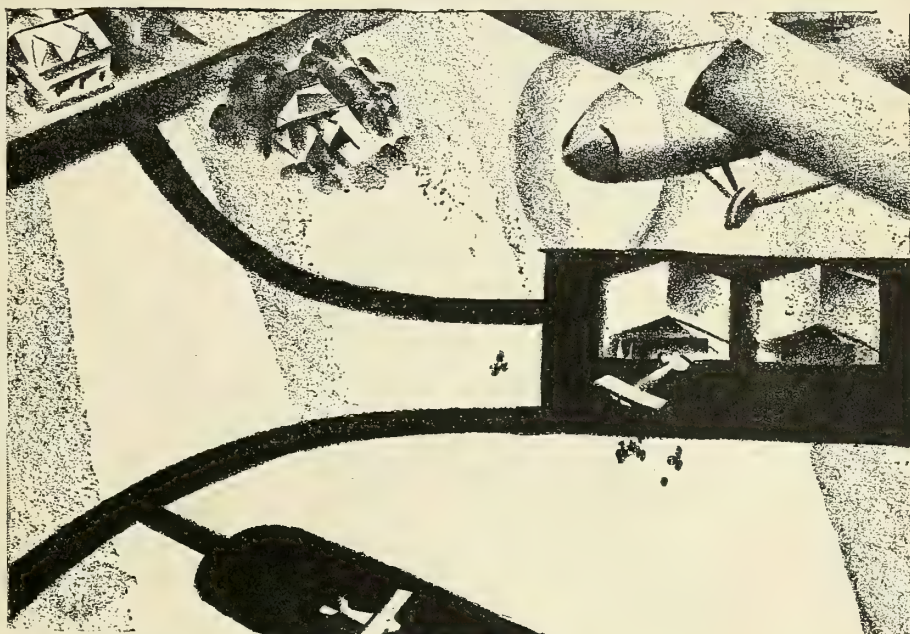
But about Courtney, an Englishman in process of becoming an American. He's another old-timer, starting with the Grahame-White Company in the shops and the drafting room in 1913. Learned to fly a year later, 1914, volunteered as pilot for the war, was rejected because he wore glasses, joined as mechanic, and was promptly given a pilot's job, since none of the other birds without glasses could fly at all at that time! In 1915 he went to France, No. 3 Squadron, Morane Parasols, as a Sergeant-Pilot, was wounded shortly after the Battle of Loos, with Archie in back and three bullets in leg, spent some time in hospital, and came out with a commission, which he had well earned in France.

In 1916 he was technical pilot at the Royal Aircraft Factory at Farnborough, a wretched thing responsible for the RE-8, among others, which killed more pilots than the enemy ever did. He survived that and went to 45 Squadron as Flight-Commander in 1917, enjoying rides on that peculiar contraption with the quivering wings, the Sopwith 1½ Strutter. (You see, I know these relics myself from personal experience.)

Courtney says, "Went through tough period with 1½ Strutters."

Tough is right! In '17 he went back to England to organize a school for instructors, and in 1918 was transferred to civil firms for experimental and flying boat work, where he tested all sorts of planes until end of war, including various jobs for Colonel Bill Larned of the American Army. From 1918 to 1929, Frank Courtney has flown and tested almost every sort of crate in existence, the original slotted wings, the autogiros, boats, and racing seaplanes. He has done racing flying—he won the Aerial Derby in 1920, the King's Cup in 1923, and various smaller events. He has done airline flying over most of the European air routes, high altitudes stuff, night-flying experiments, flying in the Arctic. The only place he hasn't flown in is Haiti—they wouldn't guarantee cracked ice with his rum punch so he refused the job.

# SMOOTH, fast approach roads— *link land with air*



TO what avail the arrow-like flight of the airplane if connecting highways, approach and service roads fail to link *ground-efficiency* with *air-efficiency*? Both are essential if we are to live out our dream of swift transportation.

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The Tarvia field man will gladly give you further details. Write, 'phone or wire our nearest branch office.

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FOR ROAD CONSTRUCTION  
REPAIR and MAINTENANCE



# UNDERGROUND HANGAR ARRANGEMENT FOR FUTURE AIRPORTS

As a member of the architectural profession who has

By Harvey Wiley Corbett, *Architect*

not submerged himself too deeply in an aeronautical trench to look over the top, I believe that an improved landing field would be one which is absolutely free of any and all obstacles. To arrive at this condition the hangars and repair shops, waiting rooms, the pneumatic mail tubes, rail and motor approaches, hotels and all mechanical necessities should be underground. And they should be sunk not on a flat field where draining conditions are not always controlled but beneath the apex of a conical shaped field rising on about a two per cent grade from its outer circumference to its center.

Under this plan everything would be off the field. Drainage would follow the best laws of nature. Every foot of the field would be available for taking off and landing. Planes arriving or leaving would fly off in opposite directions avoiding one of the principal causes of air mishaps. No matter from what direction the wind might be blowing the plane could head directly into it. There would be few other planes on the field for the reason that the hangar, sunk directly beneath the cone, would afford plenty of space to house all craft making use of the airport. Entry into the hangar would be made through a score or more of trap door arrangements operated by an observer stationed at the apex of the cone, who would first make sure that the plane had landed safely and the pilot did not wish to take off again.

The two per cent grade would accelerate a plane's take-off and permit a shorter run after the plane had touched the field.

All buildings radiating out from the edge of the field would be constructed in zone-tier formation, the first few buildings back being one story high, a block farther back the height would be increased proportionately. Such a plan would afford no obstacles to the approach of the field and would provide for close contact with factories and buildings which desired adjacent locations. This, too, would leave clear a sweeping path for a clean level head-on

again as much space as the present day airport, it would afford a greater number of safety factors and would provide for an incoming and outgoing flow of both air and land traffic that cannot possibly be equalled by present fields.

Upon this low cone, with its almost imperceptible rise, a dozen planes could land simultaneously all headed into the wind. And when piloting has reached the point where the average and not the expert flier can land in a slight cross wind the number of planes arriving simultaneously could be increased even more.

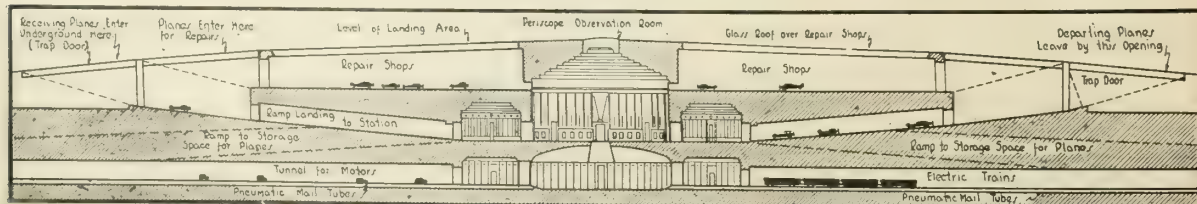
One hundred years from today the center of the average city will fall close to the center of its main airport.

Unlike the shipping centers of the factory districts which are now located on the outskirts of the metropolis close to the waterways and railway terminals, the airport will bring them to a universal shipping room, the hangar. Railway tracks, truck lanes and lanes for high speed pleasure and commercial cars will burrow their way through the bowels of the future airport where freight and passengers will be taken on and discharged. Hotels, restaurants, stores, show rooms and even warehouses where merchants can display their goods to air traveling buyers for hurried inspections will be built in this underground hangar.

Like elevators in a skyscraper the pneumatic mail tube, which already has emblazoned its speed and modern efficiency (though it is nearly fifty years old) in the postal departments of some of our great cities, will shoot mail in a hundred directions from the airport whether it be of the foregoing description or not. The fact that air mail can be shot to the postoffices from the airports and be on its way to delivery in a few minutes after the plane has landed, and not a few hours, is evidence enough that the pneumatic tube will be one of the many new and improved developments throughout the future city built to parallel the speed of the mail (Continued on page 352)



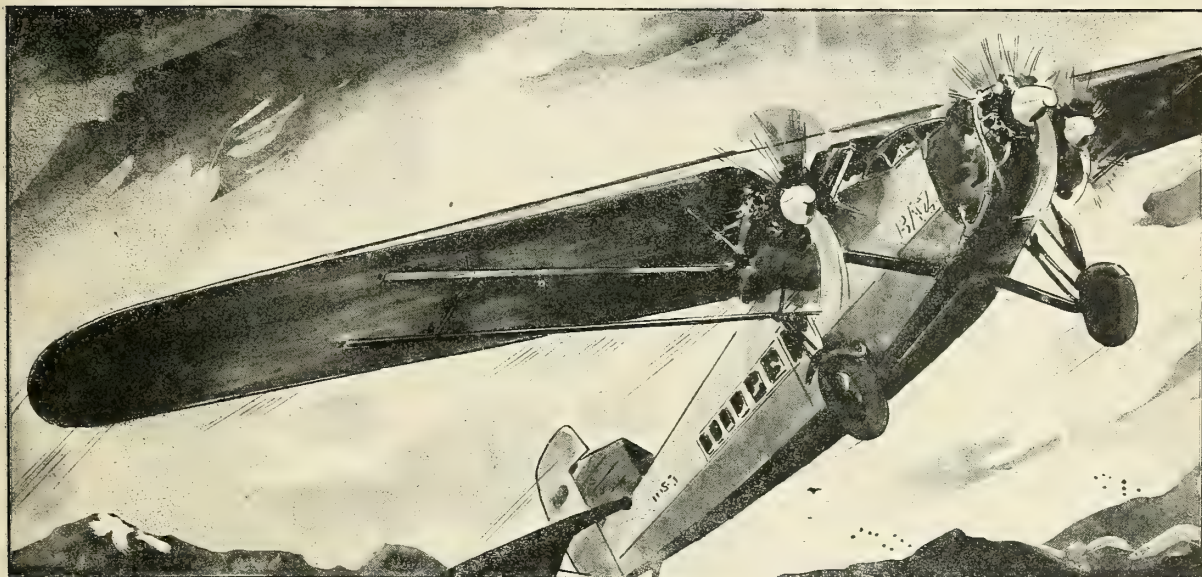
Architect's drawing of an airport with underground hangars



Cross-section visualization of the type of air terminal Mr. Corbett proposes as a means of handling future air traffic

# Everywhere throughout your ships

## *Color . . Beauty . . Luxury*



WITH the growing trend toward non-professional flying—beauty, style and color assume a new importance in the manufacture of planes. Private ships must now compete in styling, as well as in technical design—every type of airplane must meet ever higher standards of refinement, luxury and comfort.

Pioneers in the production of aircraft finishes, du Pont today supplies a complete line of materials for modern needs. For wings—clear dopes, pigmented dopes, standard Army and Navy finishing materials. For fuselage—Duco, fuselage varnish and spar varnish. For other wood and metal parts—special primers and sealers, aircraft enamels, dope-proof paints

and lacquers. In fact, for every part of the ship, the du Pont line provides a finish in its highest stage of modern development.

### *Style Experts at Your Service*

With the introduction of Duco for use in homes, on automobiles and other manufactured products, du Pont established a special department for the study of color trends and color fashions. The du Pont Color Advisory Service is in constant touch with aircraft styling in both America and Europe. It will gladly cooperate

with you in planning up-to-the-minute harmonies for your ships.

Complete information on any du Pont product for airplane use will be furnished either by mail or by a qualified representative.

### AIR-TESTED FINISHES

**Du Pont Dopes**—The du Pont line of aircraft finishing materials includes clear, semi-pigmented and pigmented dopes. They are all tested formulas of remarkable durability—proven in service as well as in the laboratory. Flexible and highly blush-resistant, the Army and the Navy have approved these products for their requirements. Available in a wide variety of highly visible colors.

**Du Pont Paints and Varnishes**—Du Pont chemists have developed a complete line of paints and varnishes including Dope-proof Paint, Spar Varnishes, Fuselage Varnish and Aircraft Enamels.



E. I. DU PONT DE NEMOURS & CO., Inc.

*Industrial Finishes Division, Parlin, N. J.*

2100 Elston Ave., Chicago, Ill.

351 California St., San Francisco, Cal.

Flint Paint and Varnish Limited, Toronto, Ontario, Canada

MEMBER OF AERONAUTICAL CHAMBER OF COMMERCE



# AIRPORT AND AIRWAY

*News of airlines, airports, and airways; radio, lighting and other auxiliary services*

ACCORDING to the latest figures from the Department of Commerce, three quarters of the holders of private pilots' licenses in the United States own their own airplanes. In light of past records, this average will continue to exist for many years to come, and quite possibly might be increased. The significance of the statement, however, immediately focuses attention on the airports which house and service this rapidly-growing air fleet. How are these multitudes of small planes being cared for? What is the airport's status in the present development of private flight?

Of course only a very small percentage of owners of privately-licensed aircraft and holders of private pilots' licenses are fortunate enough to operate their craft from their own private fields. The large majority are forced to rent hangar space at the nearest available airport, and negotiate for service and supplies at periodic intervals. The airports, therefore, now find virtual control of the private flying situation in the hands of their officials. For the next few years, or until more privately-owned fields become available, the airport will continue to be a dominant factor in the development of this important phase of aviation.

By  
Kent Sagendorph

Occasionally we see examples of misguided airport policies which apparently discriminate against the private owner. Perhaps the field executives are more concerned with the large-scale mail and passenger traffic, and regard the unobtrusive private owner as a mere detail. Or perhaps they still believe that this class of pilots consists entirely of wealthy sportsmen, to whom the expense of hangar space and periodic service and inspection is of little importance. Whatever the cause, a considerable number of pilot-owners are beginning to lift an inquiring eyebrow at the airport's bills for rent and service, and the belief is rapidly growing among these individuals that the charges they are called upon to pay are not justified in view of the airport's earnings from other sources.

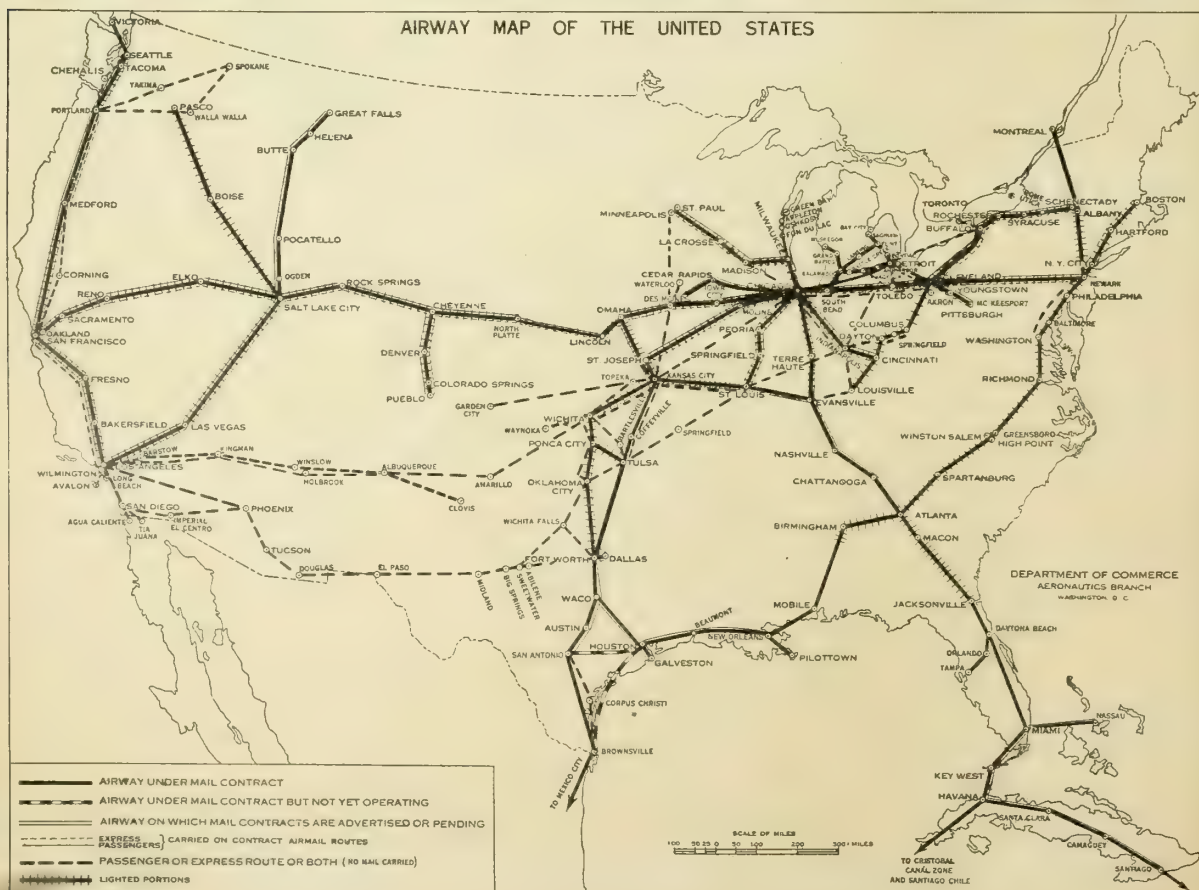
A new light is being thrown upon this subject by the survey now being conducted by the Airport Section of the Aeronautical Chamber of Commerce, which is undertaking a national and local study of the current

trend along these lines. The first reports indicate a wide divergence of opinion concerning the basis for determining hangar rentals. Some airports base their charges on the wing span of the tenant airplane; others employ the wing area in determining their rates. In certain cases, the value of the airplane is considered in fixing rental amounts. Modifications of all these methods are being used indiscriminately throughout the nation. At Alameda, Cal., the municipal airport collects a city tax in addition to the rent.

The present high cost of maintaining a private airplane is certain to result in detrimental conditions at the airports themselves. The first and most logical outgrowth of such a situation is that large numbers of potential buyers of planes are foregoing the purchase of ships because of the financial outlay involved in rent and service. One distributor of small sport airplanes recently mentioned three or four such instances; he was forced to charge \$50 per month rent on a tiny little monoplane because his hangar rent had been suddenly increased several hundred dollars per year. During this same period, the airport which owned the hangar announced a

*(Continued on next page)*

AIRWAY MAP OF THE UNITED STATES



# S P A R T A N



*The Spartan C-3 Wright powered with the Wright J-6 150 h. p. motor*

Maintaining leadership in design and inflexible standards of workmanship, Spartan Aircraft Company adds to its line the Spartan C-3 powered with the Wright J-6. Now a famous plane and a famous motor provide a combination which cannot fail in its appeal to all who recognize and appreciate correct balance between an airplane and its power plant.

The Spartan C-3 Wright is destined to make new Spartan history on the airways. It retains all the supreme qualities of Spartan design — riding comfort, stability, constant reliability — qualities synonymous with the name Spartan. To those acquainted with the

Spartan pledge and policy this new plane needs no recommendation except that it has been rigorously and scientifically tested and proclaimed by engineers a credit to its name.

The Spartan is a distinctly superior airplane because in the Spartan organization there is a spirit of high obligation to the ultimate owner. Production goes forward steadily and at a pace that strives for quality rather than quantity. There has never been a Spartan structural failure.

**SPARTAN AIRCRAFT COMPANY**  
TULSA .. OKLAHOMA

*A folder describing the new Spartan C-3 Wright will be sent on request.*



DESIGNED TO BE SAFE . . . . . BUILT TO STAY SAFE



S P A R T A N



## *Built to Meet Demand for a Better Airplane*

The principal reward of an aircraft builder's success in this time of keen competition is the satisfaction of having owners who testify with enthusiasm to the dependability of an airplane under all conditions. This reward has been enjoyed by Spartan ever since the present Spartan C-3 has been in production.

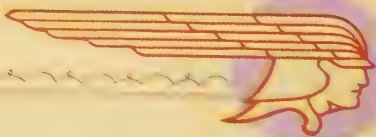
Spartan had a modest beginning in a modest factory building. Rapidly it became recognized that in Spartan were distinctive qualities of design; outstanding safety factors; superior construction principles; expert and finished

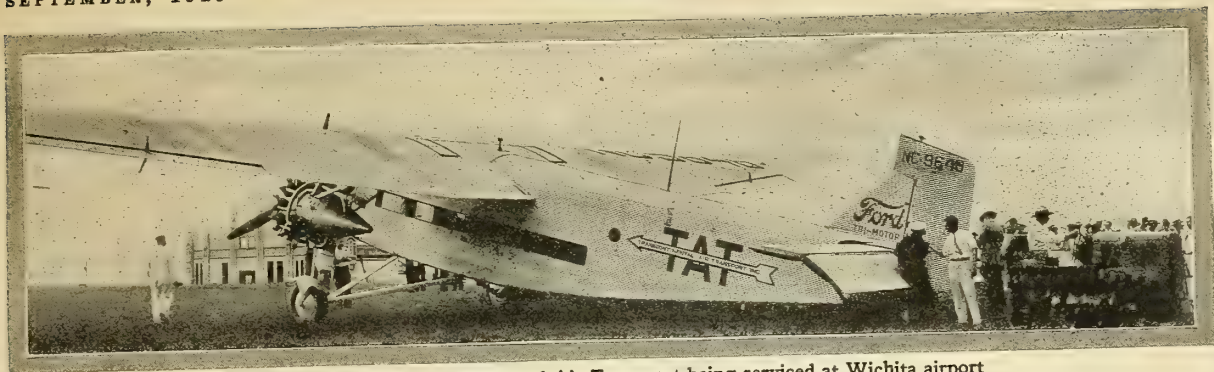
workmanship. And as a result grew the Spartan reputation for building better airplanes.

Now the Spartan factory covers two acres, Spartan factory employees number well over a hundred persons and Spartan representatives may be found in many of the principal cities of America.

Spartan Aircraft Company is confident that its policy of steady, regular production has firmly associated the name Spartan with the highest ideals of quality in aircraft, rather than in quantity produced.

SPARTAN AIRCRAFT COMPANY  
TULSA, OKLAHOMA





Ford Trimotor of Transcontinental Air Transport being serviced at Wichita airport

(Continued from preceding page)

gross income for the month of many thousands of dollars more than it had ever shown before.

This dealer, in company with a great many others, is searching about for other quarters at some less expensive airport which will lease space to him at a rate which will allow the monthly rental to his customers to be materially reduced. Sales of private airplanes suffer deeply from this cause. Distributors and dealers, in turn, are forced to seek less costly hangar space at other fields. Thus the seed of discord is sown between the airport and its tenants. Thus the germ of antagonism spreads among the flying public, to whom the airport looks for revenue.

The airport which charges an exorbitant rate for housing and maintenance of privately-owned airplane is pursuing an unquestionably short-sighted policy. By the use of tactics which will attract, rather than antagonize, the private owner, the airports can make a secure investment in the future returns of private flight. By promoting goodwill among the fast-growing flying public, the airports will win the approval of those it serves, and lay the foundations for future flying prosperity.

## NEWS OF THE AIR MAIL LINES

### New York-Chile Air Mail Line Now in Operation

THE first air mail from Chile arrived in New York on the morning of July 30 at 6:05, and was distributed in the first regular morning city delivery. Posted in Santiago, Chile, Sunday morning, July 28th, the mail arrived at Miami, Fla., over the Pan American Airways system Monday afternoon, having completed a 5,750-mile journey which requires practically three weeks by steamer.

The mail was transferred at Miami to Pitcairn Aviation, Inc., operator of the Miami-New York line, for the beginning of its distribution throughout the United States. Included in the first cargo were a number of official letters addressed to government officials in Washington and officials of the Pan American Airways, together with the regular correspondence picked up from the ten countries served on this route, which forms the longest airmail line in the world. The western mail was

transferred to the T. A. T. planes at noon on the same day, arriving at Chicago at 7:00 p. m., and at San Francisco at 4:30 p. m. Thursday, August 1st.

Six relays of planes were employed in its transport from Santiago to New York. Over the South American division, the planes of the Pan American-Grace Airways connected at the Canal Zone with the Pan American line. From this point the mail was flown in Sikorsky amphibians northward across Central America to Havana, and thence directly to Miami. The route transverse twelve countries in South and Central America. The arrival of the mail in Havana also marked the completion of the first million miles of scheduled flying by the Pan American system.

On June 21st, Pan American Airways extended service along the north coast of South America; through Colombia to Curacao, Dutch West Indies, from where it will be extended to Trinidad. A few weeks ago the final survey over the last arc of the "Lindbergh Circle" route, to be put into operation between North and South America, on the 1500-mile route through the Virgin and Windward Islands to Trinidad and thence down the coast to Dutch Guiana, was completed preparatory to the early opening of service over this line.

### Western Interest in Air Mail Increases

THE West is taking a greater interest in air mail, and in aviation in general, than the East, the Second Assistant Postmaster General, W. Irving Glover, stated upon his return to Washington after a tour of inspection of the air mail service. Mr. Glover also predicted that a total of 593,000 pounds of air mail carried in June would be eclipsed when the July figures were made available. Mr. Glover likewise predicted spirited bidding for the proposed air mail route from Pasco to Seattle, Pasco to Spokane, and Pasco to Portland, and congratulated the Guggenheim Fund for the Promotion of Aeronautics for the splendid results obtained in its campaign to interest postmasters in obtaining local cooperation in having town names painted on roofs of buildings.

### Sorts Mail Between Airport and Postoffice

AIR mail taken from the Oakland, Calif., airport to the postoffice is now being sorted en route by a postal clerk, with the

object of further speeding the city distribution of this important class of matter. As the truck proceeds through the streets, the clerk, Emil Reudy, sorts the mail into various pouches and has the job complete by the time he arrives at the postoffice.

### St. Louis-New York Route Hearing

ADVOCATES of a proposed direct air mail line from St. Louis to New York, and from St. Louis via Tulsa to Dallas and Ft. Worth, were given a hearing before the Interdepartmental Committee on Airways, in Washington on August 1st. The hearing was presided over by Postmaster General Brown. An imposing list of dignitaries, including senators and representatives and spokesmen for many of the cities along the proposed route, attended and presented arguments in behalf of their constituencies.

In announcing the hearing, the committee refrained from specifying any particular route between New York and St. Louis, explaining that it "preferred to maintain an open mind and permit all cities along the route to present their views." The route was suggested at a previous hearing as an alternative for the present transcontinental service over the Pennsylvania mountains, where weather conditions often hinder flying. Several transport companies have considered the route for air passenger service.

### Uniform Air Mail Accounting System

A UNIFORM system of accounting for the use of aviation companies carrying air mail has been devised by the Post Office Department as a step toward arriving at accurate information on which to base proposed pay rate readjustments to air mail contractors.

The system has been devised by the employees of the Department, and follows closely the uniform accounting scheme prescribed by the Interstate Commerce Commission for determining revenues and expenditures of other common carriers.

The accounting system is designed to secure information bearing on all revenues of companies carrying air mail, including the operation of sightseeing services and the transportation of passengers, express and freight. It also provides a classification of expenditures to show the net results of the several classes of service. Although rates of depreciation and the limits of obsolescence

(Continued on next page)



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are not prescribed, provision is made for these factors to be adjusted from time to time in accordance with experience. At present, the life of the modern airplane is considered to be not longer than two years, while the motor is usually written off at a rate based on hours of service. The rapid development of the art requires that consideration be given to the depreciation or obsolescence of all other equipment, including instruments, at rates higher than equipment used in other methods of transportation.

It is expected that the application of this system will serve in determining fair rates and also provide for comparison of results of different companies looking to economy of service.

#### New Beacons on Michigan Mail Routes

CONTRACTS have been awarded for the installation of additional beacons on the air mail routes of Michigan, according to 'Tex' Marshall, Vice President and General Manager of the Thompson Aeronautical Corp. At present there are 14 lights guiding the pilots who fly the night mail, and 14 new lights are to be added, making a total of 28. Eight new beacons will be established on the Detroit-Kalamazoo route, two are between Battle Creek and Kalamazoo, two more between Battle Creek and Jackson, two between Jackson and Ann Arbor and two between Ann Arbor and Detroit. When the new beacons are installed, Michigan airlines will have beacons every ten miles.

#### Two-Cent Air Mail Rate Believed Near

ASSISTANT Postmaster General W. Irving Glover believes that the Post Office Department shortly may have "to consider carrying two-cent or first class mail in the air, especially on long routes over passenger lines that have no mail contracts but are now operating." He did not elaborate upon his opinion except to declare that there was an "increasing demand in practically every community" for air mail service.

#### Colonial Establishes New Mail Record

COLONIAL AIR TRANSPORT, operating C.A.M. 1 between New York and Boston, established a new record for that line when it transported 11,948 pounds of air mail during the month of July. This is an increase of 1,121 pounds over the June record of 10,827 pounds. Canadian Colonial Airways showed a slight increase for June, and Colonial Western likewise showed more pounds of mail carried than in the previous month.

Demand for passage over the New York-Boston airline continued to increase during the month, the company being unable to take care of the demand on five occasions.

#### N.A.T. Breaks Own Record for Mail

ALL records for the amount of air mail and express carried over the lines of the National Air Transport were broken during July, when N.A.T. planes carried a total of 191,052 pounds of mail and 7,857 pounds of express. This is an increase of

18,660 pounds over June, the previous high month. The increase of express poundage amounted to 295 pounds for July over June; the miles flown showed a gain of 30,000. Radio equipment on N.A.T. planes played a large part in the air transport company's completion of ninety-nine per cent of the scheduled trips.

### TRAVEL REGULATIONS

#### Ports of Entry from Canada Designated

THE Interdepartmental Committee on Ports of Entry has designated Newport, Vermont, and Grosse Isle, near Detroit, as international ports of entry. The Ford Airport, Dearborn, Mich., is defined as a temporary port, according to a recent announcement by Seymour Lowman, Assistant Secretary of the Treasury.

Other ports of entry for airlines will be designated as rapidly as a program can be worked out, because of the great increase in air passenger traffic. The three points named above, together with others at Buffalo, Albany, St. Paul and Seattle, are believed sufficient, however, to care for the present traffic to and from the Dominion of Canada. Ford Airport will remain officially a port of entry for international air traffic until the municipal airport at Detroit is completed, according to Mr. Lowman.

#### Passenger Line Operators Defined as Common Carriers in New Mexico

ALL airline operators carrying persons for hire in the state of New Mexico fall within the definition of common carriers, and are subject to the provisions of the committee substitute for Senate Bill No. 17 in the legislature of that state.

We are further informed that operators within the state of New Mexico must apply for a certificate of convenience and authority, in accordance with the provisions of the above-quoted act. Otherwise they will be prosecuted under the state law. It is therefore suggested that all pilots and owners of aircraft operating within the state of New Mexico apply for a Certificate of Convenience and Authority to the State Corporation Commission, Santa Fe, New Mexico.

The state law also requires federal licenses for all planes and pilots operating within the state.

#### Pilot License Rate Going Up

THE Aeronautics Branch, Department of Commerce, states that licenses are now being granted to aircraft at the rate of 6,188 per year; air pilots are added at the rate of 4,160 per year and student pilots at the rate of 20,000 per year.

In the week ending July 13th, licenses were granted to 80 new pilots, 627 student pilots, 62 airplane mechanics and 119 new airplanes. Of these new licensed airplanes, 48 are in New York State; 9 each in Illinois and Ohio; 7 in Missouri; 6 each in California and Idaho; 3 each in Kansas, Michigan and Minnesota; 2 each in Colorado, Florida, Iowa, Massachusetts, Oklahoma, Rhode Island and Texas; and one each in Alabama, Connecticut, Mississippi, Nebraska, New Jersey, Pennsylvania, South

Dakota, Tennessee, Vermont, Wisconsin and Wyoming.

These figures indicate an average per state which might be taken as standard for the yearly period. The Aeronautics Branch is also experiencing difficulty in keeping pace with the maze of aircraft transfers of title, pilots' license renewals and issuance of export certificates.

Six hundred sixty-four private licenses have been issued as of July 15th, 57 of which were to women. Of this total of private pilots, approximately three-quarters own their own planes. The balance are those employed in other pursuits, or those who have acquired it as a step toward securing a transport license. This comparatively small number is only a beginning. With production and flying doubling as it has during the past year, there must soon be a greatly increased private flying activity.

### AIRPORT AND AIRWAY PROGRESS

#### National Air Traffic Conference in Kansas City

PLANS for a national conference of traffic executives representing all air transport corporations in the United States were announced at Kansas City, where the gathering will be held September 16, 17 and 18. Among the problems to be discussed will be changes in rates, consolidated ticket offices, advertising, the handling of baggage, publicity and allied subjects.

George M. Lord, of Western Air Express, chairman, announced that the development of passenger travel in the United States has been so rapid that the executives of air transport companies have had little opportunity to get together for a common solution of their problems.

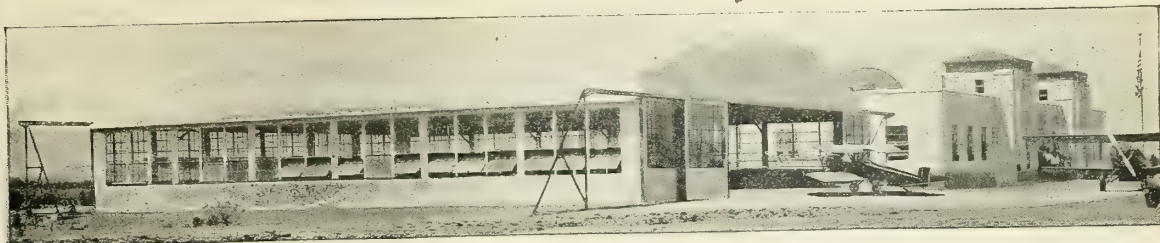
"We must knit together more closely," he explained, "the vast system of passenger lines now operating in the United States and throughout the western hemisphere, and it seems logical that such a discussion of our problems should be provided through an annual air traffic conference of the Aeronautical Chamber of Commerce air transport section."

Mr. Lord was appointed chairman of the arrangements committee for the conference by Frederick B. Rentschler, president of the A. C. C. Among those taking active part are Col. L. H. Britten, vice president of the Northwest Airways; Maj. Gen. John F. O'Ryan, president of Colonial Air Transport; Lou E. Holland, executive manager of the Kansas City Chamber of Commerce; C. W. H. Smith, general traffic manager of Western Air Express, and S. E. Knauss, general manager of Stout Air Lines. The conference will close with a dinner Wednesday night, September 18th, at which Col. Paul Henderson, vice president of Transcontinental Air Transport, will be toastmaster.

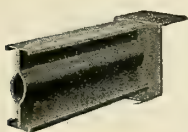
DURING its twelve months' operation, ending July 1 the Tulsa municipal airport shows a financial return of 8 per cent on the original investment, according to a report recently released by C. W. Short,

(Continued on next page)

# STEEL and STUCCO HANGAR.....



## Built by BUTLER for the ART GOEBEL SCHOOL OF FLYING.....



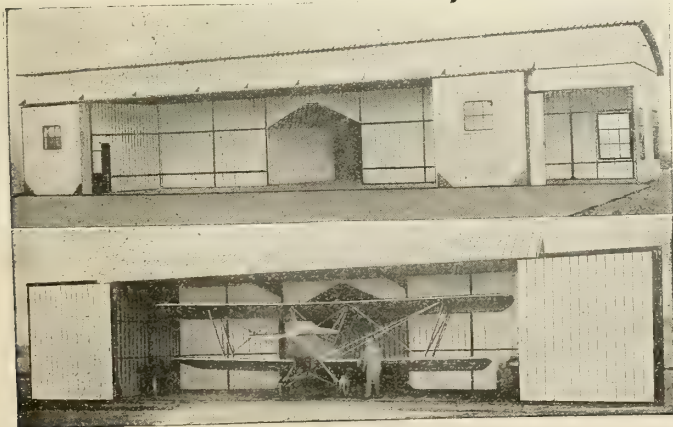
**A**T the Kansas City Airport, the Art Goebel School of Flying is sheltered in buildings of beautiful architectural design. Plans called for hangars with all the fire-proof characteristics of steel construction yet which would carry out the architectural scheme.

In fulfilling the requirements of this assignment Butler has introduced a new type of steel and stucco structure highly desirable for all airport, flying school and factory purposes. Its frame work and roof is of Butler Ready-Made Steel construction, wherein the strength of steel is multiplied by ingenious shaping to attain the greatest strength per pound. Walls are of stucco on heavy steel lathing. Or they

may be of brick veneer to the window sills and the upper walls stucco.

In Butler steel and stucco Ready-Made Buildings, appearance is greatly enhanced without lessening such features as completeness, economy in acquiring and in maintenance, firesafeness, speed in erection and structural qualities which make for permanence yet which permit enlarging.

Butler engineering service will supply you with all the detailed information needed to fulfill your particular requirements—including price if you will mention the size and type of structure in mind. Below are pictured two types of individual hangars. A new booklet picturing many other installations of Butler Ready-Made Buildings awaits your request.



**BUTLER MANUFACTURING COMPANY**  
1234 Eastern Ave.  
Kansas City, Mo.

934 6th Ave., S. E.  
Minneapolis, Minn.

# BUTLER

READY-MADE  
HANGARS





(Continued from preceding page)

manager of the field. The figures reveal that sales, service and other income netted a total profit of \$4,365. The port was acquired July 1, 1928, and has undergone a program of constant improvement since its establishment.

The complete report for June was as follows:

Gasoline sales.....	\$8,406.38
Oil sales.....	384.15
Total sales.....	8,790.53
Less cost .....	3,715.63

Gross profit on sales.....	5,074.90
Servicing planes.....	\$62.80
Cost of same .....	6.04    56.76

Total profit on sales.....	5,131.66
Other income:	
Pilots' quarters .....	224.50
Concessions .....	92.05
Storage-operation .....	1,251.00

Total .....	\$6,569.21
Less Expense:	
Labor .....	\$904.81
Salary .....	852.00
Auto .....	21.39
Heat .....	72.45
Telephone .....	41.65
Miscellaneous .....	11.78    2,204.08
Total net profit .....	\$4,365.13

#### More Adequate Markings Needed in Airways System

MORE adequate markings for daytime flying are an outstanding need of our airways system, according to the Chief Engineer of the Airways Division, Department of Commerce, Capt. F. C. Hingsburg.

In the opinion of Capt. Hingsburg, many itinerant and sports fliers will make their first flights over the airways this summer, and will find difficulty in locating airports and landing fields along the route and in identifying unmarked cities and towns seen from the air for the first time. He recommends marking circles 100 to 200 feet in diameter sprayed with yellow, instead of white paint; more clearly indicated boundary lines also painted yellow, and suggests distinctive markings on beacon towers, landing field structures and town names painted on roof tops.

#### Eight New Airways Communication Stations in Operation

ACCORDING to a recent announcement from the Aeronautics Branch, Department of Commerce, eight new airways communication stations were placed in operation recently. The new stations are located at St. Louis, Mo.; Kansas City, Kan.; Wichita, Kan.; Glendale, Cal.; Fresno, Cal.; Medford, Ore.; Portland, Ore.; and Seattle, Wash.

The station at Glendale is located on a high elevation overlooking the valley and the many airports of the vicinity. It will be used in connection with the transcontinental services being established and will furnish weather information and other communications for aircraft flying the Los Angeles-San Francisco airway.

The stations at St. Louis, Kansas City and Wichita have 2-kilowatt radio telephone broadcast equipment, which will be used for communication with aircraft over the St. Louis-Kansas City-Wichita airway, and in addition to broadcasting weather information, will be used by airports and others interested. The stations at Kansas City and Wichita replace the former airway stations

located at those points which were not fitted for radio telephone broadcasts.

The four stations on the West Coast hook-up employ standard 2-kilowatt radio telephone broadcast equipment, and will maintain communication with the planes flying the Los Angeles-Seattle airway, and will also be used by airports in addition to their regular service in broadcasting weather information. These stations will operate in conjunction with the stations at Glendale and Oakland.

#### La Roe Airport Opened in Westchester County, N. Y.

LA ROE AIRPORT, Bedford Village, Westchester County, N. Y., was officially opened on Sunday, August 4th, 1929. The port is situated at the junction of State Highway 22 and Banksville Road, approximately 30 miles due north of Roosevelt Field, L. I., and 15 miles due east of Croton Point on the Hudson River. The field includes 125 acres, of which 75 are being used for the initial operations. Take-offs are possible in all directions. The airport is well identified from the air with a huge white circle, "T" and wind cones.

In spite of a 45-mile wind on the opening day, a program of aerial entertainment was presented which has seldom been surpassed in the county.

Two thousand guests were present during the afternoon, besides numbers of transients.

#### Radio Station at Maywood Airport

THE new radio station at Maywood Field, Chicago, Ill., the last link necessary to complete the communication facilities of the New York-Chicago airway, has just been installed and placed in operation by the De-

(Continued on next page)



The parent field of the Curtiss Flying Service now being developed at Valley Stream, Long Island, New York

# Safety for workmen Less weight on plane with Murphy <sup>Non-Toxic Nitrate</sup> Dope

EVERY aircraft manufacturer is primarily interested in *safety*—both for his customers and for those who work around him. It is no wonder, therefore, that the new Non-Toxic Nitrate Dope perfected by the Murphy Varnish Company's laboratories has received such an enthusiastic welcome throughout the industry.

Not only does Murphy Non-Toxic Nitrate Dope constitute a

complete removal of the menace to workmen's health but it gives definite advantages on the job itself.

This product gives equal or even greater tautness and filling and does it with actually less consumption of material—a factor in economy and a factor in the weight of the plane.

We shall be pleased to send you complete information on Murphy Non-Toxic Dope or to give you a demonstration.

MURPHY VARNISH COMPANY, *Newark · Chicago · San Francisco*



## MURPHY FINE FINISHES

*Famous for 64 years among architects, master painters, and makers of products requiring a fine finish*

Aircraft Spraying Lacquer

Aircraft Super Spar Varnish

Sanding Primer Red

Aircraft Bronze Mixing Spar

Aircraft Enamel

*The Coupon is for your convenience*

MURPHY VARNISH COMPANY  
Newark, N. J.

- ☐ Please send further information on Murphy Non-Toxic Nitrate Dope.
- ☐ I would like to arrange for a demonstration.
- ☐ Send "Specification Manual for Aircraft"

Name .....

Address .....

City .....





"Air-Earth" Signboard designed by Standard Oil Company of Indiana

(Continued from preceding page)

partment of Commerce according to F. C. Hingsburg, Chief Engineer of the Airways Division. The Station will broadcast terminal weather information every hour at 30 minutes past the hour; the available sector weather on routes leading to Chicago will be broadcast on the even hour. The frequency assigned this station is 350 kilocycles.

#### Survey of Airport Service Charges

**WORKING** to bring its members the latest information on airport design, construction, operation and maintenance, the Airport Section of the Aeronautical Chamber of Commerce is making a survey of airport service rates and charges, both nationally and regionally.

Since the first annual airport convention in Cleveland in May, the Aeronautical Chamber of Commerce has completed the setting up of the executive machinery to serve the airport managers, accessory and equipment manufacturers, airport engineers and architects.

Hangar storage rates and the hourly basis for mechanical repairs constitute the chief items in the survey which is now under way. The basis upon which hangar charges are made is also being considered in the survey. The first returns show that there is a wide divergence of opinion concerning the basis for hangar rentals. Some airports use wing span as the rate basis; others, wing area, class of aircraft, value of aircraft, as well as modifications of these methods.

#### New Airline Extensions Map

**ACCESS** to air transportation is now available to virtually every sizable city in the United States, according to a statement from the Department of Commerce on July 24th, in connection with the publication of the new airway map of the country prepared by the Aeronautics Branch.

The map, which is considered by the Department the most extensive of its kind thus far published, was worked out to expedite the stream of inquiries regarding airways which have flooded the Department.

#### Broadcast Stations Aid Weather Service

**THE** tri-daily radio broadcast service from Station WRNY, giving weather reports for fliers on the Atlantic seaboard, was in-

augured in New York on August 1st, and now is supplying information from 17 weather bureau stations in New York state, Connecticut, New Jersey, Pennsylvania, Massachusetts and Ohio. The service is intended to supplement the regular government broadcast of conditions along the transcontinental mail routes.

The service was planned and is under the direction of Walter S. Lemmon, general manager of Station WRNY, in conjunction with Major Clarence M. Young, of the Aeronautics Branch of the Department of Commerce. Mr. Lemmon stated recently that additional points would be added as fast as arrangements could be made. He also said that it is hoped the service may be increased to cover hourly reports throughout the day. At present the broadcasts take place each day at 11:30 A. M., 3:30 P. M., and 5:30 P. M., Daylight Saving Time, from the station atop the Roosevelt Hotel, on a wave length of 49.7 meters.

#### Panama Plans Airport Improvement

**ABOUT** \$70,000 will be spent by the Panamanian government this coming year on improvements at Paitilla Field, municipal airport, it was stated July 24th by the Aeronautics Trade Division, Department of Commerce. The government hopes to be able to devote \$6,000 per month to the project.

Under the proposed plan, three runways are to be built. One of these, already under construction, is to be ready for use in the near future. The other two will be completed before the arrival of the dry season. It is the government's plan to finish construction on one of the runways so that it may be used during the rainy season. Funds for the improvement are being appropriated by the Road Board.

#### THE PASSENGER LINES

Pickwick Opens Longest Line—  
Los Angeles to Guatemala

**THE** longest passenger airline on the American continent was opened between Los Angeles and Guatemala City, a distance of 2,700 miles, on July 29th, by the Pickwick Latin-American Airways, a subsidiary of the Pickwick Bus Lines which cover California and other Western states.

Six Ryan Brougham and Fairchild six-

place cabin monoplanes are being used to start the service, and the company plans early extension of the service to Salvador and Panama, and the operation of a connecting line from Nogales, Ariz., to Salt Lake City. This line will connect with the Transcontinental Air Transport, Western Air Express, and Boeing Air Transport to all points on the West Coast, Middle West and the Atlantic Seaboard.

Planes will leave from both terminals on Mondays, Wednesdays and Fridays, with overnight stops at either Culican or Mazatlan, Mexico. Planes leaving Los Angeles early in the morning will arrive at Mexico City the next afternoon, and the trip to Guatemala will be continued the next day.

#### T.A.T. Planes Taxed by Heavy Traffic

**EXCEEDING** all expectations, Transcontinental Air Transport has completely sold out space on its eastbound and westbound Ford passenger liners, sometimes for days in advance. "Second Sections" have been employed occasionally to meet the heavy demands, and every day for the week ending July 20th, capacity loads were carried in both directions, except eastbound on Friday, when there was one vacant seat.

Colonial Air Transport, the oldest regular passenger line operating out of New York, reports an average of twenty passengers a day during the first three months of its daily operations since April 15th, with a grand total of 1,894 passengers carried until July 20th. Coastal Airways reported capacity loads during the same week (ending July 20th) and a general average of 75 per cent capacity loads over their operating period.

#### PRACTICAL NEW DEVICES

Standard Oil Devises Aerial Signboard

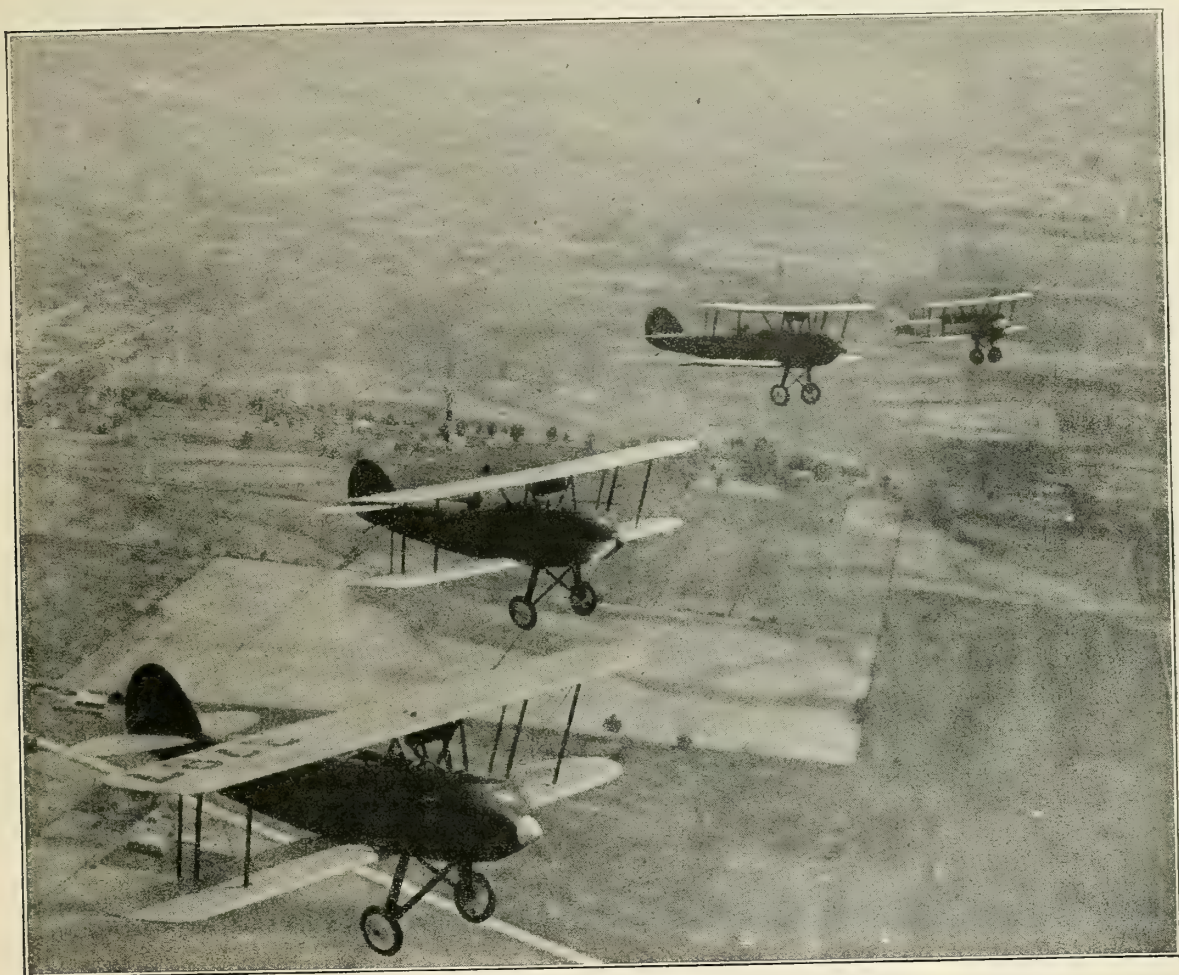
**THE** first "Air-Earth" bulletin board, designed to be read by passengers in both railroad cars and transport airplanes, has been erected near Detroit by the Standard Oil Company of Indiana. So that the board may be plainly read from the air as well as the highway it adjoins, it is placed at a 45-degree angle. In spite of this angle, the manufacturers claim that there is no distortion and that the sign is perfectly legible to the motorist as well as the aviator.

Motorists along the highway are attracted by the unusual angle of the sign, and their curiosity is satisfied by the legend which appears at the bottom below the display—"This is the first bulletin board erected advertising to people who travel by air."

#### Wind Cone and Ceiling Light Tower

**AMONG** the various types of new equipment installed at Port Columbus, Eastern Operating Base of the T.A.T., is an illuminated wind cone and ceiling light tower manufactured by the International Derrick and Equipment Co., Columbus, Ohio. By means of a powerful ceiling light controlled from the airport dispatcher's office, a beam is thrown upon the clouds at an angle of 68 degrees, and the ceiling determined by sighting through an instrument placed on the office roof.

*Waco planes like these are used by the Charles Dallas Flying Service, Inc., of Buffalo, N. Y., for student training and aerial taxi flying.*



## Large Plane Distributor Chose Socony

**W**HEN Charles Dallas, large eastern distributor of Waco and Ryan commercial planes, developed the Charles Dallas Flying Service, Inc., at the Buffalo, N. Y., Airport, he chose Socony Aviation Gasoline and Socony Aircraft Oil to operate his planes.

**Q** This flying service is devoted to student training and aerial taxi flying. Like many similar flying services in New York and New England, this company finds that Socony products and Socony service give perfect satisfaction. **Q** When flying through New York and New England, fill your plane with Socony Aviation Gasoline and Socony Aircraft Oil at any of the numerous airport gasoline stations

**S O C O N Y**

REG. U. S. PAT. OFF.

Aviation Gasoline

Aircraft Oil

**S T A N D A R D   O I L   C O M P A N Y   O F   N E W   Y O R K**



# FLAMING GAS BEACONS?

By Earle Ovington

IT was just dusk when I left my airport at Santa Barbara, California, to go to Long Beach, an air distance of about one hundred miles. It was pitch dark, of course, by the time I got half way there.

Passing over the Santa Monica hills, and a few minutes later leaving Clover Field on my starboard side and Roger's on my port, I looked around for the rotating beacon which I knew was in operation on the municipal airport of Long Beach.

The night was clear and, knowing this locality pretty well, I had no difficulty in spotting Long Beach, but no rotating beacon stood out among the sea of lights which comprise the night illumination of this city of oil wells. Large lights, small lights; white lights, yellow lights, red lights; steady lights and blinking lights, thousands of lights of every description and color. But I could not, for the life of me, pick out anything that I could identify as a rotating airport beacon. It was not until I was literally within three miles of the Long Beach airport that I was able to pick up its beacon.

Lest you think that the beacon at Long Beach is inadequate in size I hasten to assure you that it is as large as most, and larger than many. It was only because it is surrounded by the lights of the city—and Long Beach believes in using electricity for advertising purposes—that makes it so difficult to distinguish from the air.

Ah, what is that? A pillar of fire up against the foothills on my left! The burning oil well at Santa Fe Springs, of course.

What a beacon! In color, contour, and size unlike any other light in the sea of lights which stretched below me on all sides.

"Why not a flaming gas beacon for airports?" flashed through my mind; and since then I've repeatedly asked myself this question. Yes, why not?

The obvious construction would be a pylon, or tower, resembling an oil derrick, of steel, from the top of which would project a tube from which would issue the flaming gas. Far above the earth, as this flame would be, there would be no fire hazard.

The lurid reddish-yellow color of flaming gas is unlike that of any electric light; in shape it is entirely different from any other source of illumination; and its size is greater than that of any other light. In actual candlepower the flaming gas beacon is not a powerful light, but the size of the actual source of illumination is relatively great.

For these reasons the flaming gas beacon would be far more easily distinguished among a myriad of other lights than any other form of similar device.

Furthermore, a point which I had almost forgotten, the long wave-lengths of light issuing from a flaming gas beacon would penetrate fog and mist to a much greater extent than the comparatively short wave-lengths of the ordinary electric beacon.

I am aware of the fact that the airport

beacon usually serves two purposes: first, it enables the pilot to locate the field; and secondly, it tells the pilot which field it is. In other words, the light of the beacon attracts the pilot's attention and the sequence of the flashes, or the time between flashes, indicates upon which field the beacon is located.

In the case of the flaming gas beacon, the light could be cut off intermittently with a rotating shield and thus serve the same two purposes, but this would greatly impair the efficiency of the beacon. The gas could even be turned up and down automatically and accomplish the same object. A better arrangement, it seems to me, would be to have as large a flaming gas beacon as possible to attract attention to the field and, at another point on the field, a smaller electric beacon which would indicate the name of the field.

Some cities, such as Long Beach, are blowing off millions of cubic feet of natural illuminating gas into the air just because the supply is so far in excess of the demand. For these communities the cost of fuel for the flaming gas beacon would be negligible.

In many localities, on the other hand, natural gas is not available and artificial illuminating gas is expensive, if obtainable at all. But oil is portable and comparatively cheap in any section of the country and could be sprayed into the air, from some atomizing device, and serve as fuel for the flaming gas beacon which I am advocating.

Referring to the flaming oil well at Santa Fe Springs, which first put this idea into my head, I realize that no artificial beacon could be of such high intrinsic brilliancy since the consumption of fuel would be prohibitive. When I came to study the flame, however, as I did by flying round it for over half an hour, I came to the conclusion that a much smaller flame of the same character would adequately serve the purpose. It was not so much the size or brilliancy of the flame which made it stand out so prominently as it was its character; its dissimilarity as compared with the surrounding electric lights.

If the lights of a city were all steady, a rotating beacon would not be so difficult to distinguish; but there are so many flashing signs used for advertising purposes that the intermittent airport beacon is just one of a large number of blinking sources of illumination. The flaming gas beacon would give a light of an entirely different character and therefore be more readily distinguished.

## Colonial Questionnaire Shows Business Travel Leading

COLONIAL AIR TRANSPORT recently sent a questionnaire to passengers on the New York-Boston service. Replies indicated that of the 586 passengers who answered the questions, 253 made the trip to save time in keeping business appointments; 103 others, a majority being business men, listed as their reason a preference for flying over other modes of travel.

## Mid-Continent Air Express Inaugurates Two New Air Lines

MID-CONTINENT AIR EXPRESS, which is affiliated with Western Air Express, recently began operations over two lines. One runs from Denver, through Colorado Springs, Pueblo, Dodge City, Wichita, Topeka and terminates at Kansas City. The other branches off at Pueblo, going to Albuquerque and El Paso. The latter line will stop at Santa Fe, only to take on or discharge passengers.

At El Paso, the new Standard Airlines airport is used; Lowry Field at Denver; municipal airports at Colorado Springs and Pueblo; Western Air Express's new terminal at Albuquerque; municipal airports at Dodge City, Topeka and Kansas City. There are seventeen intermediate landing fields.

## TAMPA AIRPORT SURVEY

TO encourage the location of aeronautic industries at Tampa, Florida, the Tampa Chamber of Commerce has made a survey of facilities for aeronautic enterprises in Florida, and has issued a report setting forth the natural resources of the city. According to the report Tampa offers a vast expanse of level ground where flying conditions make test flights practical and comfortable all the year, where excessive heat and excessive cold are rarely known, and where climatic conditions eliminate the necessity of heated plants during the winter months. Transportation both by rail and water keeps the cost of materials for a factory down because of low freight rates.

Under the direction of the aviation committee of the Tampa Chamber of Commerce and in cooperation with city officials, much space has been cleared on the 240-acre municipal airport, the hangar has been completed, the field properly marked and a runway and ramp completed, giving a take-off distance of 7,000 feet. In addition, the committee has secured from the city a budget of \$18,000 for additional improvements, principally to include markers and beacons to prepare the field for night flying. A network of wide, smooth highways radiates in every direction from Tampa. Practically every town of any size in Florida has an airport, and because of the typography of the country, an unlimited number of emergency landing fields are available.

The average temperature for the last 30 years at Tampa has been 72 degrees Fahrenheit according to the report. The average for August, Tampa's hottest month, is 81.6 degrees, and January, the coldest month, 60.8 degrees. The average annual precipitation is 40.01 inches per year for the past 39 years. There is seldom a rain which lasts more than two hours and the water is quickly absorbed by the sandy soil. Thunder is heard an average of 79 days per year. Thunderstorms are of small extent, and can be easily avoided by the aviator.

Tampa's favorable weather situation is due, the report states, to the fact that it lies south of the general storm paths across

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# TRUSCON STEEL HANGARS

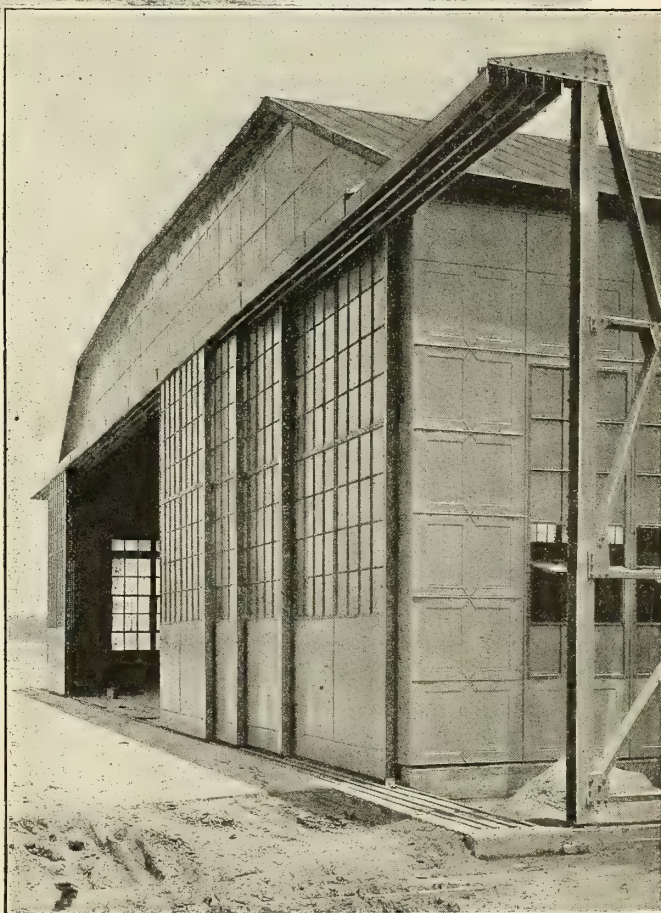


**MODERN  
DAYLIGHT  
FIREPROOF  
CLEAR FLOOR SPACE  
FULL WIDTH STEEL DOORS**

Ease in handling airplanes, fire protection and ample daylight are provided in Truscon Steel Hangars. There is a type, size and arrangement of these standardized buildings to exactly meet each individual need.

Truscon furnishes the various steel products required in any type of hangar construction. Truscon Steel Hangar Doors are of distinctive design and construction to insure durability, easy operation and long service. They open the full width and are available in all sizes of Straight or Curved Track types.

Write for suggestions, literature and quotations, sent you without obligation.



*Standard Oil Company Hangar, Municipal Airport, Memphis, Tennessee. Truscon All Steel Hangar with Airplane Hangar Doors*

**TRUSCON STEEL COMPANY, YOUNGSTOWN, OHIO**

TRUSCON STEEL COMPANY OF CANADA, LIMITED, WALKERVILLE, ONT.

Warehouses and Offices in Principal Cities

# TRUSCON HANGAR DOORS



(Continued from preceding page)

the continent and is on the northern edge of the northeast trade winds, where their force is very small. Tampa is continually in the Horse Latitudes, where more or less high barometric pressures always exist. There is an average of less than three days per year without sunshine. Fog is found an average of eleven times per year, and rarely lasts later than 8:30 a.m.

The average wind velocity in Tampa is 6.6 miles per hour and the winds come at night, swinging through east, southeast, south in the morning to southwest in the afternoon. A wind velocity of 28 miles per hour is recorded an average of 11 times per year. The highest wind velocity ever recorded is 55.

The chamber of commerce aviation committee, with the assistance of various civic clubs, has secured funds to cover scholarships in aviation to representatives of Latin-American countries. Invitations were extended through the United States Department of Commerce, to Guatemala, Honduras, Nicaragua, San Salvador, Panama and Costa Rica. With the exception of Nicaragua, all the countries have accepted the invitation to send a representative to Tampa to study aviation.

Within the past few weeks both the American International Airways and the New York, Rio and Buenos Aires Lines have established bases at Tampa and will make this city their point of entry and embarkation for planes carrying passengers, mail and express from New York to Central and South America. A good-will flight of the *Miss Washington*, a Sikorsky amphibion ship of the New York Rio lines, carrying a party of officials of the company, started from Tampa and is being continued down the east coast of South America, and the *Southern Star*, a Sikorsky landplane of the American International Company, is now en route to the west coast, from Tampa, carrying officials of that company. Both parties will make contacts, surveys and establish flying bases preparatory to the opening of their lines.

John K. Montgomery, president of American International firm and vice president of the New York, Rio company, recently announced that at the Tampa base the two companies would build four new hangars, establish a water-landing base, build repair shops, warehouses, a passenger depot and install a Croyden Board, which will enable airport officials to keep in direct communication with all planes.

## AKRON MUNICIPAL AIRPORT

FOR the past few years a few far-sighted citizens of Akron, Ohio, have seen the need for a municipal airport. However, not until last year was there sufficient public sentiment to authorize the issuance of bonds to finance such a project. The development of a municipal airport was begun late in 1928.

The airport committee of the Akron Chamber of Commerce secured options on the land desired as the location for the city's airport at fair prices before land speculators had an opportunity to secure the land. The airport committee, through the Akron Industrial Foundation, then secured an advance of funds necessary to take over the land required before the city's funds were available from the bond issue authorized by the city council.

Through these activities, the chamber of commerce and the city were able to assure the Goodyear-Zeppelin Corporation that the proper airport facilities would be provided, and as soon as it secured the contract for the two dirigibles, the company announced these would be constructed at Akron.

The site decided upon lies directly upon the Great Divide between the watersheds of the Cuyahoga and the Tuscarawas Rivers. This summit location eliminates the possibility of flooding at any times. Although on the summit, the site is sheltered on two sides by hills.

The site was approved by the Goodyear-Zeppelin Corporation as nearest meeting its requirements, since it is only one mile from the plant. The direction of the prevailing wind is from the southwest. In this direc-

tion the horizon is very low and away from the built-up section of the city. The altitude of the floor of the port is 1,040 feet above sea level. The port is unusually free from fog. The field is approximately rectangular in shape, being  $1\frac{1}{4}$  miles in each direction and containing 890 acres of land, four miles from the center of the city and accessible by automobile in 12 minutes. Four arterial highways lead from the city to the airport. It lies at the junction of State Highway Routes No. 241 and No. 17. The port itself is surrounded by paved roads, with a total of nine paved roads leading into the boundary of the port. It is served by city bus lines and the B. & O. Railroad.

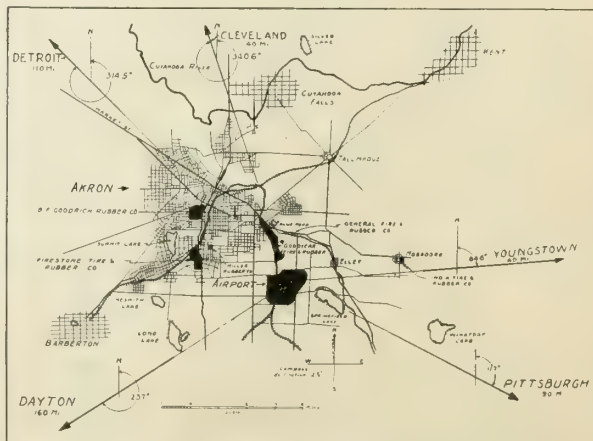
Since the beginning of the development, less than a year ago, water service has been extended to the port, a large storm sewer has been constructed to form the main outlet for surface and underground drainage, a contract has been let and partially completed for moving one million yards of earth to grade the surface of the airport, the entire area has been cleared, and plans are complete for the construction of a sanitary sewer to serve the buildings on the airport.

The greater part of the land acquired for the airport was farm land. A portion, however, had been subdivided, and it was necessary to purchase and remove about thirty houses. The character of the soil is sand and gravel mixed with clay. This mixture compacts readily and drains exceptionally well.

A part of the port is now being used for a temporary landing field. This area is 2,000 feet long and is lighted with the necessary boundary, obstruction, beacon lights and floodlights. This landing area provides facilities for air mail and passenger planes now using the port.

When fully developed, the airport will provide runways in eight directions 2,500 feet long, with one 5,000-foot runway in the direction of the prevailing wind. Adjoining this area will be a semicircle of airplane hangars extending from the administration building and the larger hangars around to the southerly end where the smaller hangars will be built. The hangar

(Continued on next page)



Left: dirigible hangar and general layout of Akron Municipal Airport; right: location of the port in relation to the city of Akron

# Announcing the Sperry AGA Floodlight

**O**WING to the demands of major Airports for a high powered floodlight that is **efficient** and **dependable**, the Sperry Company has designed and now has in production a 1000 millimeter, 180 degree, dioptric Floodlight with the Sperry Full Automatic Arc Lamp Mechanism. Incorporated in its design is the experience gained in nearly a decade of field lighting.

This powerful floodlight not only completely illuminates the field but makes the hazards around the field stand out as if by day.

Following are some of the outstanding features of this light.

**Lens:** Precision ground and polished, 1000 millimeter, 180 degrees dioptric lens manufactured by the American Gas Accumulator Company.

**Housing:** Constructed entirely of aluminum alloy and chromium plated brass. Two large doors permit easy access to the interior.

**Ventilating System:** Motor driven, exhaust type.

**Lamp Mechanism:** Sperry High Intensity Arc, Full Automatic Lamp, standard for U. S. Army, 60-inch Anti-Aircraft Searchlight. A single trim of carbon burns for two hours.

**Control:** Can be controlled locally or remotely as conditions require.

This powerful Floodlight has been adopted as standard by Curtiss Airports, Inc. See it in the Curtiss Booth at the Cleveland Aircraft Show.

*Full particulars upon request.*

Distributors: CURTISS FLYING SERVICE, Inc.

## SPERRY GYROSCOPE CO., INC.

BROOKLYN

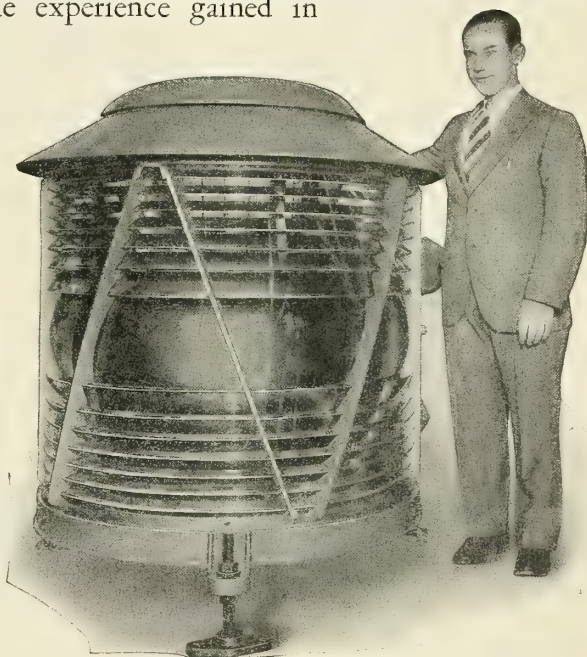
CLEVELAND PHILADELPHIA SEATTLE



NEW YORK

LOS ANGELES

SAN FRANCISCO





(Continued from preceding page)

arrangement is such that expansion can be made to four times the size of the first units. The hangars will be of uniform architecture, shape and color. From this semicircle, taxi-ways will be provided to the runways. An area  $\frac{3}{4}$ -mile long and  $\frac{1}{2}$ -mile wide will be used for lighter-than-air ships. In this area the Goodyear-Zeppelin Corporation is building a dock 1,200 feet long and 325 feet wide in which the Navy ZRS-4 and ZRS-5 will be constructed.

The airship dock, or hangar and manufacturing building, which will be considerably larger than the one at Lakehurst, N. J., used as the home of the U. S. Navy dirigible *Los Angeles*, is being built by the Goodyear-Zeppelin Corporation. The structural frame differs from other airships docks in this country in that it consists of a series of arch trusses giving to the shell an approximately parabolic cross-section. The doors, too, which are spherical in shape, differ radically from those used on other airship docks in the United States. Involved in the construction of the building are 7,000 tons of steel, 1,300 concrete piles and about 10,000 cubic yards of concrete.

The foundations are so placed that the longitudinal axis of the building will coincide with the direction of prevailing winds during flying weather. In size the structure exceeds any other airship dock yet built either in this or in a foreign country, and also has the distinction of covering the largest single floor area ever placed under one roof, this area being approximately 389,000 square feet.

Since the new Akron factory and dock is to be used principally as a manufacturing building, its size was largely determined from the dimensions of the two new ships, the ZRS-4 and the ZRS-5. Some idea is obtained of the size of these new dirigibles by comparing their gas capacity of 6,500,000 cubic feet with the 2,500,000-cubic foot capacity of the *Los Angeles* and the 3,707,550-cubic-foot capacity of the *Graf Zeppelin*.

It is said that the Akron factory and dock is large enough to manufacture a ship about twice the capacity of those now contemplated. The design for the Akron airship dock was originated in the engineering department of the Goodyear-Zeppelin Corporation, and final working drawings were developed by Wilbur Watson & Associates, Cleveland, Ohio, under the direction of Dr. Karl Arnstein, vice president in charge of engineering of the Goodyear-Zeppelin Corporation. It will consist of a parabolic shell. Perhaps the most novel feature of the design is presented by the doors, which are composed of segments of a sphere supported at the top by a huge pin and at the bottom by trucks running upon a circular railroad track. Similarly shaped hangars and doors have been built in Germany, but in much smaller sizes. The doors at Akron will be operated by a fixed gear train engaging a movable rack attached to the lower part of the door.

The arches supporting the main shell are spaced 80 feet apart on centers and carry a bracing system composed of horizontal and

vertical trusses, which in turn support rafters spaced on one-foot centers, and these rafters carry the sub-purline spaced on eight-foot centers, to which the roofing plates are attached. The steel arches are designed as three-hinged for dead load only and are then converted at the completion of erection into two-hinged arches to resist deflection from the wind. Wind stress determination on the structure was predicted upon wind tunnel tests made on a small scale model at the New York University Daniel Guggenheim School of Aeronautics in New York City.

Since this dock will be primarily a manufacturing building, along each side of the shell will be extensive shops, storage rooms, offices, drafting rooms, etc., comprising the manufacturing facilities of the plant. The building will be equipped with elevators to carry workmen up and down, with overhead trolleys for assembly and with stairways and catwalks covering its entire inside periphery. Artificial lighting will be used for practi-

cally all assembly operations on the dirigibles to be constructed in the building.

The entire surface of the field, after the grading has been completed, will be sown with grass seed to secure turf. The runways will be progressively surfaced. About 150 acres around the boundaries of the port will be available for parking automobiles. This parking area lies above the floor of the port so that the port may be viewed from the parking grounds. A fence will be constructed around the boundary of the port to prevent people from getting out onto the flying field. In order to complete the development, it is necessary to re-locate two main highways and two miles of the B. & O. Railroad.

The territory around the airport is zoned so as to protect the horizon of the port and yet provide areas for aeronautical industries. A hilltop park will be developed between the airplane hangars and the proposed highway east of the hangars.

## PORT COLUMBUS

EASTERN TERMINUS OF TRANSCONTINENTAL AIR TRANSPORT

PORT COLUMBUS, owned and operated by the municipality of Columbus, Ohio, is situated approximately seven miles from the center of the city. The proceeds of a municipal bond issue were used in purchasing, constructing and equipping the airport. When the port is complete, the city will have spent more than a million dollars for the development. Since there are but few landing obstructions, all of which are well marked, the field is particularly safe for night operations. Being located on an improved highway and having its own railway station, it is about twenty minutes distant from any of the downtown hotels. The T. A. T. maintains a splendidly appointed bus for the convenience of its passengers who may care to be transported to and from the airport.

When this port was planned, every possible effort was made to provide for the comfort of the people who use the various airlines operating in and out of it, and to insure quick handling of the traffic, matters which no modern airport can afford to overlook. The Pennsylvania Railroad has erected a passenger station immediately adjacent to the field at which the *Airway Limited* stops to interchange westbound passengers in the morning and the *American* takes on eastbound passengers in the evening. Passengers making the transcontinental journey thus are relieved of the necessity of entering the city itself.

The city purchased nearly 1,000 acres of land, of which 600 are devoted to the landing area proper, the remainder being occupied by the various buildings, parking spaces, etc. An area of 200 feet on either side of the runways is drained by five-inch tile placed in parallel rows thirty feet apart. Elsewhere they are at sixty-foot intervals, a system that insures the proper draining of the field even in the worst of weather. There are two runways, each 100 feet wide, one of which is 3,500 feet long in the direction of the prevailing winds, and the other

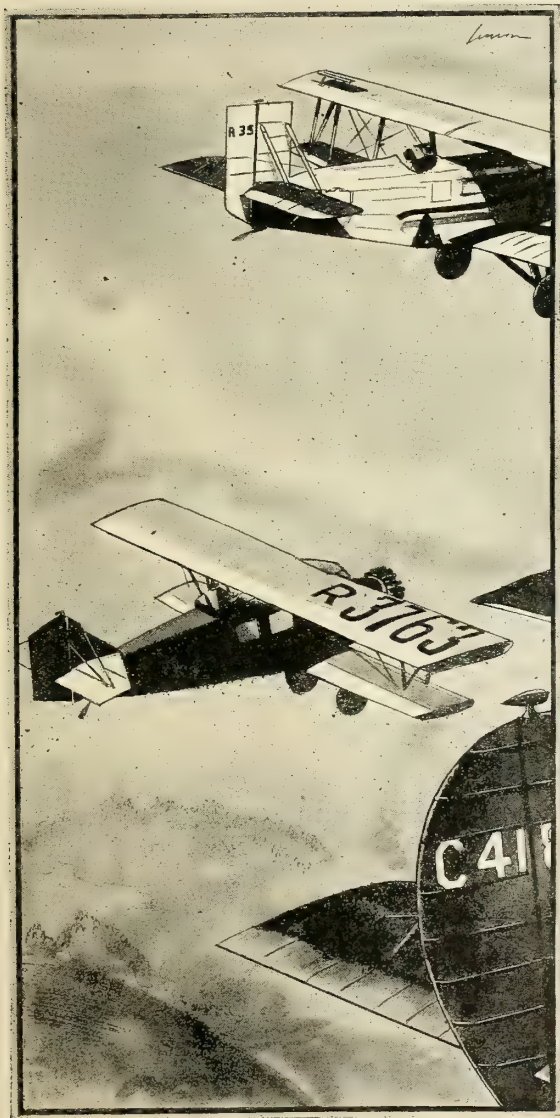
2,500 feet in length, constructed of concrete and surfaced with asphalt. At the outer ends of both runways as well as at their intersection, are turning buttons to permit the pilots to use the entire length of the runways and to eliminate the necessity of running off the edge of the pavement when turning about. Since all of the hangars are being built at the east side of the field, a forty-foot taxiway and a thirty-five-foot apron, extending the entire length of the field, were made to provide an entrance to them. An unloading button, approximately two hundred feet wide, extends to within fifty feet of the administration building.

The architectural design of the buildings on the airport is particularly attractive. They are all constructed of a light face brick and all buildings on the port harmonize both in color and architecture. The hangars and buildings were designed by the Allied Architects Association of Columbus. Buildings erected in the future will likewise harmonize.

The administration building, a two-story brick structure with an observation tower above, is located at the southeast corner of the field, a short distance from the railway station, to which it is connected by means of another canopied walk similar to the one on the opposite side of the building. On the ground floor are the ticket office, the telegraph office, the restaurant and kitchen, the offices of the Curtiss Flying Service, the writing room and the lobby; on the upper floor are the sleeping rooms, clubrooms, the press and radio room and the offices of the port superintendent and of T. A. T. A glass enclosed control tower on the roof affords a clear view of the sky and the entire field. It is from this tower that the traffic of the field is directed. Atop the tower are the T. A. T. wind vane and anemometer whose readings are registered on dials in the weather bureau office. A plaza is on the north side of the building,

(Continued on next page)

# HE WHO GOES ALOFT TODAY— WILL GET HIS FRIENDS TO FOLLOW!



HE public's knowledge of flight is largely second-hand—its interest is all too much "for the other fellow." The speed of flying, the safety of planes, the endurance of good engines has

been repeatedly proven. But 110,000,000 Americans are on the ground instead of riding the air.

Some of course will never go up. Thousands will go once and remain anchored to earth thereafter. But still other thousands upon thousands will think with delight of their glorious, practical adventure and repeat and repeat.

Aviation will grow as its "First Flight Club" grows. And the way to spin out the miles . . . to build better motors . . . and more able planes . . . is to bring flying within the reach of *all* the earth-bound—to encourage by word, by deed, and by opportunity given, the millions who ought to fly but do not.

For the true day of aviation dawns when the ownership of a plane is a serious and sensible question . . . when a man and his family choose the make and model best suited to their needs . . . as today they choose an automobile.

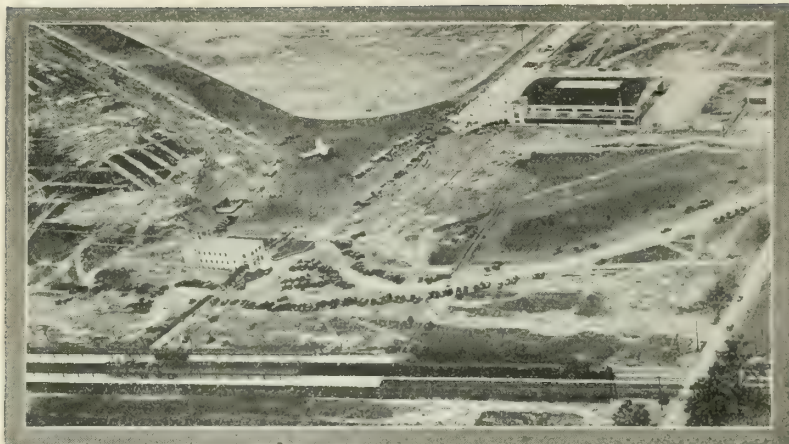
Wright seeks to place flying on a practical, business basis. So that all can make their first flight in utter confidence . . . in a knowledge that everything is shipshape and secure . . . from Whirlwind engine to tail skid.



**WRIGHT**  
AERONAUTICAL CORPORATION  
PATERSON, NEW JERSEY







Port Columbus, showing administration building, hangar and railway station

(Continued from preceding page)

permitting visitors an unobstructed view of the field. All the lights and starting signals are operated by the plane dispatcher who is on duty twenty-four hours a day. The basement contains the electrical switching panels, transformers and a number of storage rooms.

Just north of the administration building is the first of the nine hangars to be built at the port, that of the Transcontinental Air Transport, Inc., at a cost of \$120,000. Measuring 206 by 125 feet, it accommodates nine of the company's trimotor ships at one time, in addition to housing a heating plant, weather bureau, pilots' quarters and several offices. A lean-to 20 feet wide extends for 200 feet on one side. The lean-to will be utilized for shops and a repair base. The framework of the hangar is of steel, most of which is bricked in. All of the sides including the doors are of glass panels. It presents a very imposing appearance for this type of a building.

The problem of lighting the field at night was solved by the purchase of a General Electric Novalux floodlighting unit, the first to be used by an airport as part of its regular equipment. Mounted on a platform near the municipal hangar this unit provides sufficient light to illuminate the entire landing area. Eight 3,000-watt 32-volt lamps are supplied with current by a 32-volt stepdown transformer installed in the rear of the light. A series of horizontal

shutters, adjustable to the area to be illuminated, tend to reduce the glare to a minimum. There are no other auxiliary floodlights except the building floods, no others being necessary. A standard Crouse Hinds beacon with a 180-degree spread is mounted on top of the control tower, and is used along with the green on-course lights which flash in Morse code the letters P. C. (Port Columbus). Other lighting equipment includes the illuminated wind indicator, ceiling light, and the obstruction lights placed on every obstacle within a half mile of the field and on all of the buildings. The T. A. T. radio station was erected a mile north of the port so that the steel towers would not prove a menace to planes. Communication between the station and the T. A. T. hangar is maintained by telephone. In the hangar office there are three Bell Teletype machines, connecting with all of the other offices along the route. Weather reports, orders, and other information are transmitted over these instruments.

Columbus is very fortunate to have secured the services of Capt. Wm. F. Centner, former airways extension director of the Department of Commerce, as superintendent of Port Columbus.

The people of Columbus have adopted the Port as their own, and almost any night from one to five thousand persons assemble at the field about the time the eastbound T. A. T. plane arrives. They remain quite often for exhibition flying at night.

## THE INFLUENCE OF AIR MAIL ON FOREIGN EXCHANGE

By D. O. BAUDUOY

THE advent of Mail-Service, by reducing considerably the time for correspondence to reach destination, has not failed to bring certain changes in the quotation of rates of exchange for sight and 90 days' sight drafts.

For instance, in Chili, in view of the efficiency, regularity and speed offered by the air mail line of the Compagnie Generale Aeropostale (Latecoere Air-Lines), which operates a weekly service between Chili, Argentine, Uruguay, Brazil and Europe, the Central Bank of Chili recently addressed to all the banking institutions of that country, a circular letter advising them that it was compelled to change its rates for drafts drawn at sight or at 90 days' sight in pounds sterling. The result has been a sudden change in the quotation of rates for Pounds Sterling on the Chilean market.

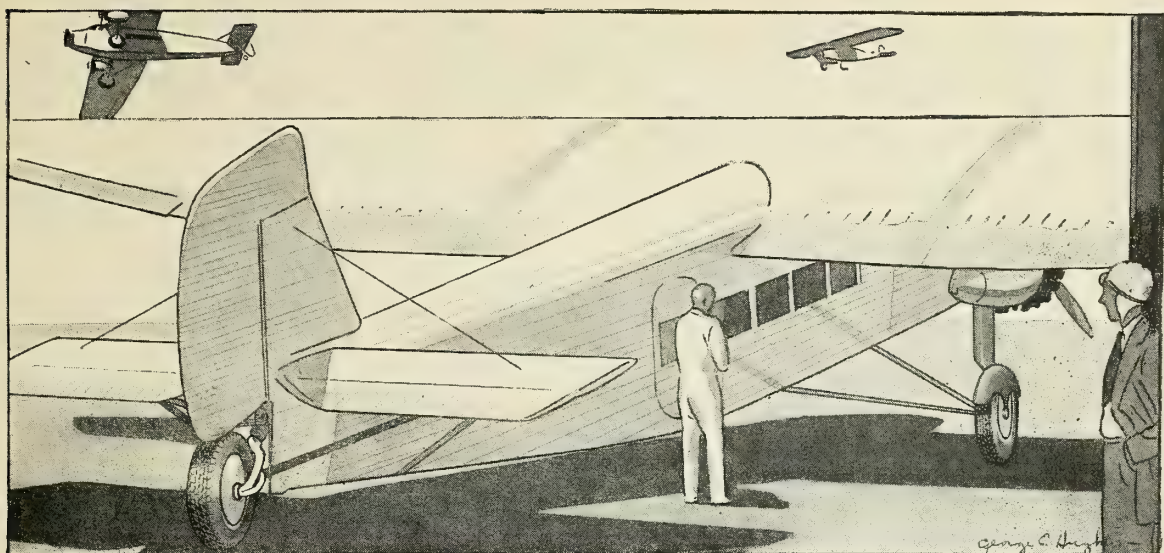
Mail sent from Santiago de Chili through the air mail service of Compagnie Generale Aeropostale reaches Europe in approximately 10 days, whereas through the usual channels it takes between three weeks and a month. The saving in time for mail from Santiago de Chili to Buenos Aires and to Rio de Janeiro is also very important.

CITY officials of Ann Arbor recently ordered gravel from a new school site hauled to the municipal airport and spread on the runways. Three runways have now been graveled and are reported suitable for all-weather landings. Lack of proper drainage has formerly made the sod runways too wet for use at times.

RAPID progress is reported on the new \$20,000 hangar being constructed by the Kohler Air Express of Chicago at the Kent Airport, Grand Rapids, Mich. According to John B. Kohler, president of the Kohler company, a fleet of three amphibian planes, carrying six passengers and a crew of two, will be utilized in a trans-lake service between Grand Rapids and Milwaukee. The planes will dock at Muskegon, where a landing ramp is under construction at the city pier, and Milwaukee, and will make a land flight to Grand Rapids. Later it is proposed to extend the service to St. Paul.



Left: the T. A. T. hangar at Port Columbus; right: the administration building with its observation tower



# 6 GOOD REASONS

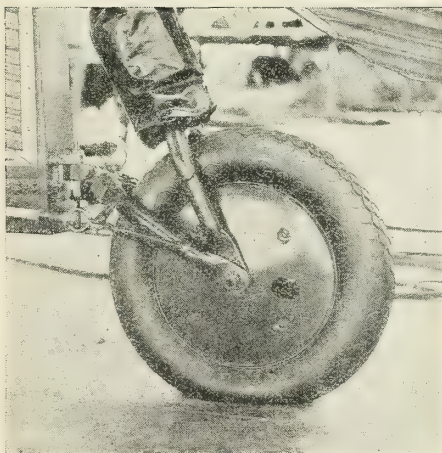
why  
you need a  
Goodrich  
Tail Wheel

"IN the future all planes will be equipped with tail wheels as initial equipment," says one prominent airplane manufacturer.

Even today you will see these new Goodrich tail wheels in increasing numbers on the newer models of airplanes.

Simply because you may at present be shackled with a tail skid plane, you need not remain so a day longer. For . . .

Any good mechanic can convert your plow skid into a free rolling Goodrich tail wheel for you . . . and give you ground "independence" in the bargain.



Simply order the size you need through your nearest Goodrich distributor, or write us for information. The unit comes mounted on the wheel ready for assembly.

The B. F. Goodrich Rubber Company, Akron, Ohio. Established 1870. Pacific Goodrich Rubber Company, Los Angeles, Calif. In Canada: Canadian Goodrich Company, Kitchener, Ontario.

## The Six Good Reasons

**1**  
Goodrich tail wheels eliminate back strains and dolies.

**2**  
With Goodrich tail wheels you can push out of your own hangar . . . take off *unaided*.

**3**  
With Goodrich tail wheels you can taxi around hangars . . . out of them . . . into them, and through lines of parked cars as easily as driving your automobile.

**4**  
Goodrich rubber tail wheels *absorb* landing shocks. They make three-point landings easier . . . on both plane and passengers.

**5**  
Goodrich tail wheels will not "plow up" air fields.

**6**  
Brakes can be applied to Goodrich tail wheels.

# Goodrich Rubber for Airplanes



# RUSSELL "Lobe"

*Ask about the new  
Russell "Lobe" Pongee  
Silk Parachute  
Selling at \$275*

*For that  
**EXTRA** factor  
of safety!*

FAMOUS flyers, air transport companies, training schools, individual flyers and aerial passengers the world over have adopted the Russell "Lobe" Parachute as standard flight equipment.

In an emergency you simply pull the release ring—the Russell "Lobe" Parachute does the rest . . . . It has a record of 100% efficiency in use! Veteran air men prefer this aerial life-saver because it has no springs, no rubber bands, no pilot chute—nothing to deteriorate, nothing to get out of order.

*Write for Descriptive Folder and Name of Nearest  
Dealer and Service Station.*

**Russell Parachute Company**  
1202 Kettner Blv'd San Diego, California

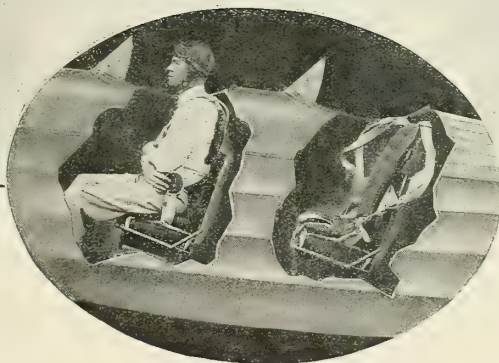
Eastern Sales Office: 122 E. 42nd St., New York City

**\$250  
\$275 or \$350  
COMPLETE**

# PARACHUTES



*Now* **EQUIPPED**  
*with the new*  
**RUSSELL**  
**DETACHABLE BACK-PAD**



The Russell "Lobe" Parachute fits right into the seat—and this new detachable BACK-PAD holds the harness in position while forming an additional cushion for greater comfort.

You fasten and unfasten the parachute harness while you are seated in the cockpit—in the same manner as you snap the safety belt. It's all very simple and practical . . . . An indication of the many other refinements you will find in the Russell "Lobe" Parachute.

**Russell Parachute Company**  
**1202 Kettner Blv'd : San Diego, Calif.**

Eastern Sales Office:  
122 E. 42d Street, New York City



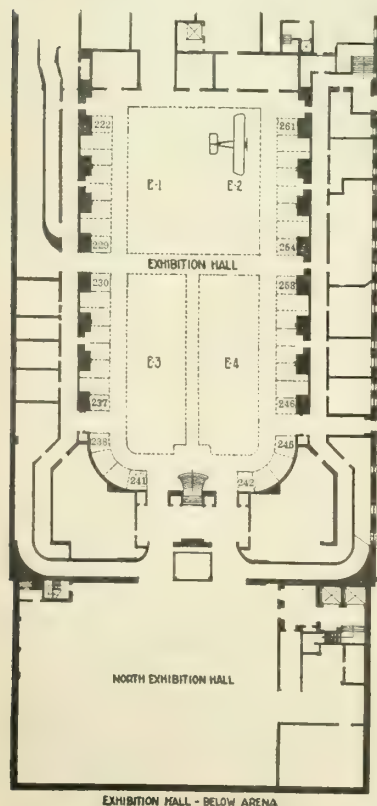


Cleveland Municipal Auditorium which, with its annex, will be used for the exposition held during the National Air Races.

## EXHIBITORS at the Cleveland AIR SHOW

### EXHIBITION HALL AIRPLANE EXHIBITS

EXHIBITORS	SPACES
Star Aircraft Company.....	E1-E2
Henri de Lott Aircraftsmen Co.....	E1-E2
Arrow Aircraft & Motors Corp.....	E1-E2
Acme Aircraft Corp.....	E3
Bruner-Winkle Aircraft Corp.....	E3
Inland Aviation.....	E4



### OTHER EXHIBITS (Exhibition Hall)

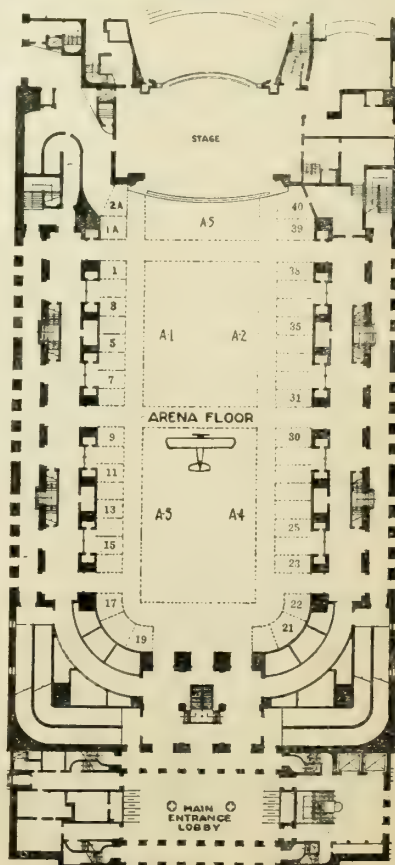
EXHIBITORS	BOOTHS
Viair Enterprises.....	222
Indiana Lamp Corporation.....	223
Standard Oil Co. of Indiana.....	224-225
Aeronautical Safety Rating Co.....	226
Streloff Naughton Corporation.....	227
Crouse-Hinds Company.....	228-229
Andrew C. Campbell, Inc.....	230
Ohio Seamless Tube Company.....	231
Shell Petroleum Company.....	232-233
John A. Roebling Sons Company.....	234
Gilbert & Barker Mfg. Co.....	235
National Acme Mfg. Co.....	236
Cook Paint & Varnish Co.....	237
Van Dorn Electric Tool Co.....	238
Bourne Fuller Company.....	240-241
Radiomarine Corp. of Amer.....	243
Pocahontas Oil Company.....	244-245
Tidewater Oil Sales Corp.....	244-245
Pyrene Manufacturing Co.....	246
Parks Air College.....	247
Park Drop Forge Company.....	248
Champion Spark Plug Co.....	249
Port Orford Cedar Products Co.....	250
Canvas Leather Specialty Co.....	252
Fire Extinguisher Serv. Co.....	253
Hill Auto Body Metal Works.....	254
United States Acceptance Corp.....	255
Air Maze Company.....	256
Upson Walton Company.....	257
Allith Prouty.....	258
Chicago Screw Company.....	259

### ARENA FLOOR AIRPLANE EXHIBITS

EXHIBITORS	SPACES
Travel Air Company.....	A1 to A3
Bellanca Aircraft Corp.....	A1 to A3
Waco Aircraft Company.....	A1 to A3
United Aircraft Group.....	A3-A4
Great Lakes Aircraft Corp.....	A3-A4

### OTHER EXHIBITS (Arena Floor)

EXHIBITORS	BOOTHS
Bendix Aviation.....	1 to 4
Stromberg Motor Devices Co.....	1 to 4
Scintilla Magneto Company.....	1 to 4
Eclipse Machine Company.....	5 to 8

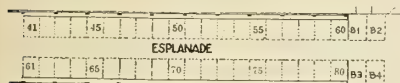


EXHIBITORS	BOOTHS
United Group.....	9 to 14
Boeing Airplane Company.....	9 to 14
Boeing Air Transport, Inc.....	9 to 14
Hamilton Aero Manufacturing Co.....	9 to 14
Pratt & Whitney Aircraft Co.....	9 to 14
Chance Vought Corporation.....	9 to 14
Wright Aeronautical Corp.....	14 to 19
Szekely Aircraft & Engine Co.....	20-21
Simmons Boardman Company.....	22-23
United Group.....	25 to 30
Cleveland Pneumatic Tool Co.....	31 to 33
Wyman & Gordon.....	34-35
Axelson Aircraft & Engine Co.....	36-37
Aero Digest.....	38
American Cirrus Engines, Inc.....	39-40
Balsa Wood Company.....	1A
Beattie, H. W. & Sons.....	Corridor
Berry Brothers, Inc.....	Corridor
Russell Parachute Co.....	Corridor

## ESPLANADE

The esplanade is located between the arena floor of the main auditorium and the West Wing Annex, connecting the two buildings.

EXHIBITORS	BOOTHS
Westinghouse Elec. & Mfg. Co.....	41 to 43
Fleishman Transportation Co.....	46-47
David Lupton's & Sons Co.....	48-49
Continental Motors Corp.....	50-51
Robertson Company.....	52-53
Packard Electric Company.....	54
Thompson Products, Inc.....	57 to 60
Linde Air Products Co.....	61-62
S. K. F. Industries, Inc.....	63-64
Floyd J. Logan Aviation Co.....	65
Ohio Crankshaft Corp.....	66
Detroit Steel Products Co.....	67-68
Easy-on-Cap—Eaton Axle Co.....	69
Wm. D. Callaghan Company.....	70
South Bend Lathe Works.....	71
Leece-Neville Company.....	72-73
National Air Pilots Assn.....	74 to 76
DeWalt Products Corporation.....	77
General Electric Company.....	78 to 80
Allen & Drew, Incorporated.....	B1
Aeronautical Products Corp.....	B2



THE Aeronautical Exposition will be open daily, from Saturday, August 24th, up to and including Monday, September 2nd. It will be open to the general public from 10 a.m. to 10:45 p.m. each day.

Because of the great interest shown by schools and school children in this Exposition, two special mornings have been set aside and featured as Children's Sessions. The hours of ten to twelve on Monday, August 26th, and Tuesday, August 27th, have been set aside for this occasion.

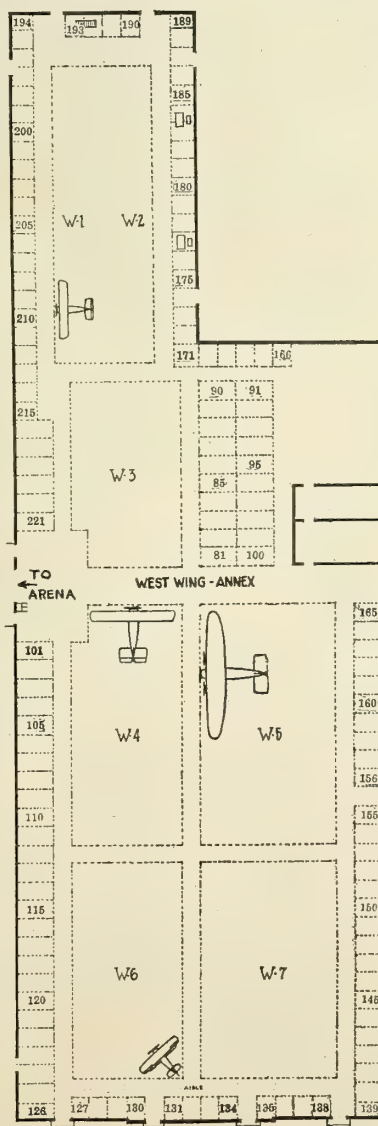
The Aeronautical Exposition will be open daily from 9:00 a.m. to 10:30 a.m. for the purpose of showing the exhibits and products to members of the industry, visiting pilots, etc. These early morning sessions are strictly private, with the public excluded.

August 24th is designated as "Opening Day"; Sunday, August 25th—"All Ohio Day"; Monday—"Exchange Club Day"; Tuesday, August 27th—"Kiwanis Day";

Wednesday—"American Legion Day"; Thursday—"Ad Club, Rotary, Canada Day"; Friday—"Grotto Day"; Saturday, August 31st—"Edison Day"; Sunday, September 1st—"All Nations Day"; Monday, September 2nd—"Akron Day."

## WEST WING--ANNEX AIRPLANE EXHIBITS

EXHIBITORS	SPACES
Alliance Aircraft Corp.....	W1-W2
Aeromarine Klemm Corp.....	W1-W2
Stearman Aircraft Co.....	W1-W2
Detroit Aircraft Corp.....	W1-W2
Golden Eagle Aircraft Corp.....	W1-W2
Fokker Aircraft Corp.....	W3
Curtiss Flying Service, Inc.....	W4
American Eagle Aircraft Corp.....	W4
Ford Motor Co.—Stout Airplane Div.....	W5
Gates Aircraft Corp.....	W6
Davis Aircraft Corp.....	W6
Moreland Aircraft, Inc.....	W6
Simplex Aircraft Corp.....	W6
General Aircraft Corp.....	W6



## OTHER EXHIBITS

(West Wing Annex)

EXHIBITORS	BOOTHS
Hodkinson Aircraft.....	W7
Schlee-Brock Aircraft Corp.....	W7
E. L. Inlow.....	W7
Heath Airplane Company.....	W7
Austin Company.....	81-82
Thompson Aeronautical Corp.....	85-86
Richfield Oil Co.....	89 to 92
Standard Steel Propeller Co.....	95-96
Canton Drop Forge Company.....	97-98
Curtiss Flying Service, Inc.....	101 to 104
Standard Oil Company.....	105 to 107
Johnson Airplane & Supply Co.....	112-113
A. G. Spalding and Bros. Co.....	114-115
Comet Engine Corporation.....	116
Scenic Airways, Inc.....	117
Buckeye Blower Co.....	118-119
Champion Mach. & Forging Co.....	123 to 126
Champion Mach. & Forging Co.....	127-128
Strong Carlisle & Hammond.....	129-130
Endicott Forging & Mfg. Co.....	131
May Company.....	132
Willard Storage Battery Co.....	133
Air Travel News.....	134
Vacuum Oil Company.....	135-136
Service Recorder Company.....	137
Electric Storage Battery Co.....	141
Nicholas Beazley Airplane Co., Inc.....	142-143
General Airmotors Company.....	144
Texas Company.....	145-146
The M & M Company.....	147
Associated Oil Company.....	148
Guardianair Corporation.....	149
Edo Aircraft Corporation.....	150 to 152
Metallurgical Laboratories, Inc.....	155
Robert Bosch Magneto Co., Inc.....	156-157
American Paulin System, Inc.....	158
Sky Specialties, Inc.....	159-160
E. W. Bliss Company.....	161-162
Dayton Airplane Engine Company.....	163
Western Electric and Mfg. Co.....	164-165
Naturaline Company of America.....	167
Ex-Cell-O Tool & Mfg. Co.....	168 to 170
Kinner Airplane & Motor Company.....	172
Crescent Tool Company.....	173
Macwhyte Company.....	174
Aero Supply Mfg. Company, Inc.....	175
Fyr-Fyter Company.....	176
Aviation Assurance Agents of Amer.....	178
Steward Hartshorn Company.....	179
Lycoming Manufacturing Co.....	180-181
International Flare-Signal Co.....	182
Columbian Vise & Mfg. Company.....	183
Vichek Tool Company.....	187
Irving Air Chute Company, Inc.....	190
Aero Digest.....	192-193
Air Reduction Sales.....	194 to 196
Tipps & Smith, Inc.....	197
Alliance Aircraft Corp.....	198
Sherwin-Williams Company.....	199
Haskelite Mfg. Co.....	200
Automotive Industries.....	201
Kendall Refining Company.....	202-203
Paragon Engineers, Inc.....	204-205
Universal Air Lines System.....	206
LeBlond Aircraft Engine Corp.....	207-208
Bohn Aluminum & Brass Corp.....	209-210
Warner Aircraft Corporation.....	211-212
Aircraft Safety Devices, Inc.....	213
Cleveland Tool & Supply Co.....	214
Parker Appliance Company.....	216-217
U. S. Air Compressor Company.....	221



## THE NATIONAL AIR RACES AND AERONAUTICAL EXPOSITION

(Continued from page 56)

license issued by the contest commissioners of the National Aeronautic Association.

In spite of these stringent requirements most of the well-known woman pilots of the country have made application or have announced their intention of so doing. The first entries officially acknowledged were those of Marvel Crosson, San Diego, Cal.; Florence Lowe Barnes, San Marino, Cal.; Blanche Wilcox Noyes, Cleveland; Louise M. Thaden, Pittsburgh, Pa.; Mary E. Von Mack, Detroit, Mich.; Amelia Earhart, New York City; Bobbie Trout, Inglewood, Cal.; Ruth Elder, Beverly Hills, Cal.; Gladys O'Donnell, Long Beach, Cal.

Other outstanding woman pilots who are likely contestants include: Patty Willis of Los Angeles, Lady Mary Heath of New York, Thea Rasche, Mrs. Keith Miller of New Zealand, and Kathryn Moran of Gettysburgh, Pa.

Fifty Army planes, ranging from the largest bomber to the smallest pursuit type participate in the events, according to announcements from the War Department. Although the Army has entered planes in National Air Races in former years, this year's group is one of the largest ever to participate. The newest types of fighting craft are to be demonstrated, among them the huge bombers of the Second Bombardment Group, located at Langley Field, Va.

Forty-five of the Army planes will join a tactical exhibition flight during the races. Included in this number are 18 attack planes from the attack group located at Fort Crockett, Galveston, Tex.; 18 pursuit planes from the First Pursuit Group, Selfridge Field, Mt. Clemens, Mich., and nine bombers from Langley Field. The personnel numbers 58 officers and 62 enlisted men.

The bombers are the same ones which made the transcontinental tactical flight from Langley Field to the Pacific Coast.

The attack group pilots are competing for the Mason M. Patrick Trophy, an event named for the former Chief of Air Corps. This event is limited to members of the Third Attack Group, and all planes sent to Cleveland from this group are entered.

Added to the Army's list of planes, announcements from the Navy and Marine Corps show plans for expansive exhibition work. A squadron of 18 Navy planes was selected from those making the best showing in the recent aircraft concentration review off the coast of Southern California. Six Marine planes also are taking part in the air races.

The U. S. S. *Los Angeles* will visit the air races and land on the race side of the municipal airport on Wednesday, August 28th. It will be moored to an expeditionary stub mast 55 feet high, which will be placed on the field near the home pylon, directly in front of the thousands of spectators on the grandstands. It is expected that the *Los Angeles* will arrive about 3 p. m., just at the peak of interest

in the races. The dirigible will probably leave the races for Lakehurst at the opening of events on Thursday afternoon.

The Aeronautical Chamber of Commerce sessions are held on August 26th, 27th, 28th, 29th from 9:00 a. m. until 1:00 p. m. The National Aeronautic Association is holding its sessions on August 29th, 30th, 31st from 9 a. m. to noon. The exposition is open daily from 9:00 a. m. to 10:30 a. m. for the purpose of showing the exhibits and products to members of the industry, visiting pilots, etc. These early morning sessions are strictly private with the public excluded.

Enlistment of an army of approximately 10,000 men and women has been necessary to plan and stage the 1929 National Air Races and Exposition. Since early in May, a corps of workers has been active at headquarters in the Hotel Cleveland. This corps has been augmented from time to time as preparatory details became more arduous, until at the time of opening approximately 5,000 people were



Silver trophy cups offered by Aero Digest for race events

on the payroll beside the thousands who worked voluntarily. It is estimated that the payroll expenses aggregate \$40,000 daily, or a total of \$400,000 gross.

At headquarters at the Hotel Cleveland, 49 complete departments and committees have been maintained. In addition, large numbers of cooperating departments and committees have been functioning in Cleveland and throughout Ohio, as well as at cities where the various air derbies originate or transverse in their routing.

Arrangements have been made at the airport for the parking of 38,000 automobiles. A program has been arranged for the handling of this traffic to permit an even flow of cars to and from the airport. Traffic is directed by a regiment of National Guardsmen plus what police are available. It is estimated that visiting planes will total 1,200.

## COMPLETE SCHEDULE OF NATIONAL AIR RACE EVENTS

### WOMEN'S AIR DERBY

Santa Monica, Calif., to Cleveland, O.  
Prizes, \$8,000 and Lap Money

**T**HIS race is under the auspices of The National Exchange Club and sponsored by The Santa Monica Bay District Exchange Club.

The Cleveland Pneumatic Tool Co., of Cleveland, Ohio, maker of "Aerol" shock

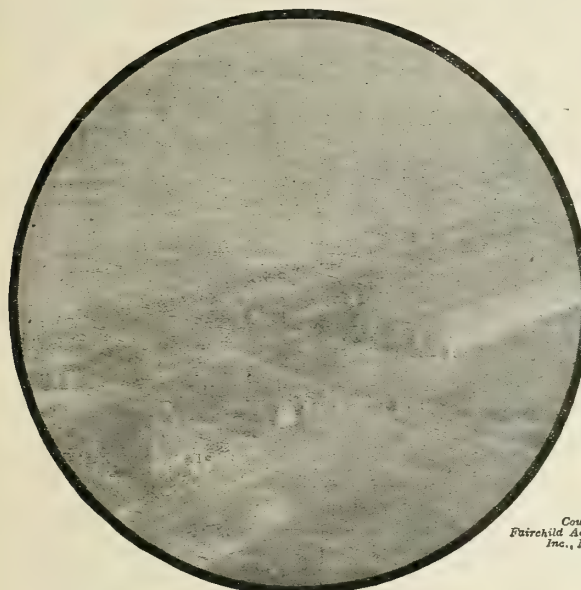
absorbers for planes, has donated a trophy, the value of which is between \$2,500 and \$3,000, to be competed for annually in the Women's Derby. This trophy will be delivered to the chapter of the National Aeronautic Association to which the entrant belongs whose plane receives the greatest number of merit points according to the following formula:

Average speed in m.p.h. 2.5  
Cubic inch piston displacement — Figure of merit

This aims to equalize the chances of the small and large planes to win this trophy.

### A. DIVISION OF PRIZE MONEY

- (1) An illustration follows of how the
- (Continued on next page)



*Sweating or fogging of lens obscures vision and makes flying difficult.*



*Luxor Goggles provide crystal-clear vision under actual flying conditions.*

*Courtesy  
Fairchild Aerial Surveys,  
Inc., N. Y. C.*

# You can see clearly with LUXOR GOGGLES

Among other distinct features, LUXOR GOGGLES have one vital *patented* advantage which has made them popular with experienced fliers. They have a ventilating circuit which PREVENTS STEAMING AND FOGGING, and also deflects air currents away from the eyes. This permits clear vision.

One of the first lessons that early fliers learned

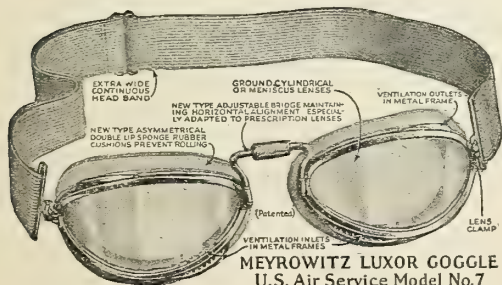
was that LUXOR GOGGLES most completely met active flying conditions. As aviation has expanded, LUXOR GOGGLES have met *new* conditions, and now, nearly all of the more experienced pilots recognize the importance of using these finer goggles, made by Meyrowitz.

*Ventilating Circuit*—prevents sweating and fogging

*Clutch-Type Bridge*—provides correct alignment

*Asymmetrical Cushion*—eliminates air seepage

*Double Lip Cushion*—for perfect comfort



MEYROWITZ LUXOR GOGGLE  
U.S. Air Service Model No. 7

Be sure you get the genuine LUXOR GOGGLES made by Meyrowitz if you want the assurance of comfort and perfect vision. You will find them on sale by leading sporting goods and optical stores, aircraft dealers, flying schools and airports.

If you wear glasses, your lenses can be duplicated and fitted into LUXOR GOGGLES.

U. S. Air Service Model 7—\$13.75 Regular Model 6—\$9.75

U. S. Air Service Model 6—\$10.75 Luxor Model 5—\$7.50

See Luxor Goggles featured in the  
**CLEVELAND AIRCRAFT SHOW**

August 24 to September 7

in the booths of

Nicholas-Beazley Airplane Co., Marshall, Mo.  
Johnson Airplane & Supply Co., Dayton, Ohio.  
Floyd J. Logan, Cleveland, Ohio.  
A. G. Spalding & Bros., New York City.

Send for  
catalogue

*E. B. Meyrowitz*  
INCORPORATED  
AND  
ASSOCIATED COMPANIES



520 Fifth Ave., Dept. A., New York

MINNEAPOLIS

ST. PAUL

DETROIT

PARIS

LONDON



(Continued from preceding page)

main prize money of \$8,000 will be allotted. If there are eight planes starting in Class DW and twelve planes starting in Class CW, on an equal proportionate basis—there being in all 20 planes—Class DW would only have allotted to it \$3,200 and Class CW would have allotted to it \$4,800, but by reason of the rule set forth in General Rules governing air derbies, Class DW would be allotted \$4,000 and Class CW the balance, which would be \$4,000.

#### B. DIVISION OF LAP PRIZE MONEY

(1) An illustration follows of the allotment of lap prize money. Exclusive of any lap prize money donated for a specific class; assuming there is \$1,800 in lap prize money for the Women's Derby and there are 5 planes starting in Class DW and 10 planes starting in Class CW, then because of the 50-50 split rule, \$900 will go to Class DW and \$900 to Class CW; also, if \$200 is available for the first plane reaching St. Louis in the Women's Derby, then this \$200 will not be given to the first plane reaching this point, but because there are two classes in the Women's Derby, \$100 will be given to the first plane in Class DW and \$100 to the first plane in Class CW.

#### C. PLANE ELIGIBILITY

There are two classes in the Women's Derby.

(1) Class CW—Planes are eligible to enter this class that are powered with motor or motors having a total of more than 275 and not more than 510 cubic inch piston displacement.

(2) Class DW—Planes are eligible to enter in this class that are powered with motor or motors having a total of more than 510 and not more than 800 cubic inch piston displacement.

(3) Planes may be open, closed or cabin type.

(4) Dual controls not allowed.

#### D. PILOTS

(1) General Rules for Pilot Eligibility.

(2) Pilots may either fly alone or carry one other woman as mechanic who shall not be a woman who has soloed an airplane. No male person is allowed to ride in any ship in this derby race.

(3) Entrants must carry at least a three days' supply of food and one gallon of water for each occupant of the plane. The weight of all food and water is included in the pay load limitation.

#### E. PAY LOAD REGULATIONS

(1) General Rules for Pay Load Regulations and Limitations on Weight permitted to be carried in each plane.

#### F. MINIMUM NUMBER OF CONTESTANTS

(1) A minimum number of 5 contestants must actually start in each class of this race or no race will be declared for that class and no prize money awarded. In that event all prize money will be contested for by the class that does have 5 contestants.

#### G. MARKINGS ON PLANE

(1) All derby contestants are assigned a number in the race which must appear on

bottom of the lower right wing and on each side of the fuselage back of the pilots cockpit in characters as large as possible.

(2) Because the Santa Monica Bay District Exchange Club, together with the National Exchange Club and affiliated Exchange Clubs are coöperating in sponsoring this Women's Air Derby, each entering airplane shall have painted on each side of the fuselage the official Exchange Club emblem and the right is reserved to permit having painted below that emblem, on each side of the fuselage, the names of those cities whose Exchange Clubs support the event.

### CLASS "A" PLANES

#### ALL-OHIO DERBY RACE

Prizes \$1,875 and Trophy

1st Prize, \$1,000; 2nd Prize, \$500; 3rd Prize, \$375.

#### A. PLANE ELIGIBILITY

(1) Open to all type planes powered with motor or motors of not more than 275 total cubic piston displacement.

(2) These planes are not permitted to carry more than 20 pounds in excess of 0.2 pounds of pay load per cubic inch piston displacement.

(3) Leave Cleveland August 25, 1:10 p. m.; arrive Cleveland August 26, about 3 p. m.

#### C. LAP PRIZE MONEY

(1) Lap prize money will be awarded only for ships powered with motor of 100 cubic inch piston displacement or less.

### MIAMI-MIAMI BEACH TO CLEVELAND AIR DERBY

Prizes \$5,500 and Ten Trophies

The City of Miami and Miami Beach have made substantial contributions to the prize money and trophies in this derby.

#### A. DIVISION OF PRIZE MONEY

(1) An illustration follows for the allotment of the main prize money of \$5,500. If there are 9 planes starting in Class C and 13 planes in Class B or 22 planes in all, then on a proportionate basis, Class C would have allotted to it \$2,250 and Class B allotted to it \$3,250. But, because of the rule set forth in General Rules Governing Air Derbies, Class C would be allotted \$2,750 and Class B the balance, which would be \$2,750.

(2) An illustration follows for the allotment of lap prize money, exclusive of any lap prize money donated for a specific class: Assuming there is \$1,500 in lap prize money for Miami-Miami Beach Derby, and there are 9 planes starting in Class C and 12 planes starting in Class B, then because of the 50-50 split rule, \$750 will go to Class B and \$750 to Class C; also if \$200 is available for first plane reaching Atlanta, then this \$200 will not be given to the first plane reaching Atlanta, but \$100 will be given to the first plane in Class B and \$100 to the first plane in Class C reaching this point.

#### [B. PLANE ELIGIBILITY]

(1) There are two classes of planes

eligible in the Miami-Miami Beach to Cleveland Derby.

(2) Class B.—Planes are eligible to enter this class that are powered with motors of more than 275 and not more than 510 cubic inch piston displacement.

(3) Class C.—Planes are eligible to enter this class that are powered with motors of more than 510 and not more than 720 cubic inch piston displacement.

(4) This derby is open to planes of open or closed cockpit types, but not open to planes of cabin types.

### CABIN TYPE—CLASS D PHILADELPHIA TO CLEVELAND AIR DERBY

(From Central Airport at Philadelphia)

Prizes \$4,000

1st Prize, \$2,000; 2nd Prize, \$1,000; 3rd Prize, \$600; 4th Prize, \$400, and Lap Prize Money.

The Central Airport of Philadelphia has made a substantial contribution to the prize money in this derby.

The Titanine Company offers an additional prize of \$250 to the first ship in this event reaching Cleveland Airport which has been completely finished with Titanine dope.

#### A. PLANE ELIGIBILITY

(1) This derby is open to ships of the cabin type only, powered with a motor of more than 720 cubic inch piston displacement and not more than 800 cubic inch piston displacement. The planes in this class are not permitted to carry more than 20 pounds in excess of 0.5 pounds pay load per cubic inch piston displacement.

### OPEN TYPE—CLASS D PORTLAND, OREGON, TO CLEVELAND LAND AIR DERBY

Prizes \$6,000 and Lap Prize Money

1st Prize, \$3,000; 2nd Prize, \$1,500; 3rd Prize, \$750; 4th Prize \$450; 5th Prize, \$300.

The Port of Portland and the Aviation Committee of the Chamber of Commerce are responsible for a substantial contribution to the prize money in this derby.

The Titanine Company offers an additional prize of \$250 to the first ship in this event reaching Cleveland Airport which has been completely finished with Titanine dope.

#### A. PLANE ELIGIBILITY

(1) Open to open cockpit and mail type ships powered with motor or motors of not less than 720 cubic inch piston displacement and not more than 800 cubic inch piston displacement.

### CLASS F AIR DERBY FROM OAKLAND, CALIFORNIA, TO CLEVELAND

Prizes—\$5,000 and Lap Prize Money

1st Prize, \$2,500; 2nd Prize, \$1,250; 3rd Prize, \$750; 4th Prize, \$500.

Open to any type plane powered with motor or motors totaling more than 800 cubic inch piston displacement.

(Continued on next page)



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**at Most of the Shows ... have parts & supplies**

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Airplane manufacturers and owners, airport operators, flying school operators—all look to Nicholas-Beazley as the World's Leading Aeronautical House. The answer is: highest quality products—a *complete* stock from propeller to tail—quick delivery—right prices—intelligent co-operation.

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(Continued from preceding page)

### CANADIAN DERBY

This derby is open to Canadian pilots only.

### NON-STOP AIR DERBY

Non-Stop Air Derby from Los Angeles to Cleveland:

Prizes \$7,500 and Trophy.

1st Prize, \$5,000; 2nd Prize, \$2,500.

Must start so as to arrive at Cleveland Airport between 1 p. m. and 8 p. m. of any day, August 25th to September 2nd.

An interested commercial concern offers a special prize of \$2,500 in addition to the regular prize money.

Pilots and passengers in this race are compelled to wear parachutes. Only male pilots are allowed to compete in this race.

### RIM OF OHIO AIR DERBY

Prizes \$2,000

1st Prize, \$1,000; 2nd Prize, \$600; 3rd Prize, \$400.

#### A. PLANE ELIGIBILITY

(1) Open to any type of plane with motor or motors totaling more than 800 cubic inch piston displacement.

Leave Tuesday, August 27th; arrive Wednesday, August 28th.

## CLOSED COURSE RACE EVENTS

### EVENT NO. 1

#### OPEN TO WOMEN PILOTS ONLY

(1) Open to all type planes powered with motor or motors having a total of less than 510 cubic inch piston displacement.

(2) 10 laps of 5-mile course.

(3) Prizes \$1,000; 1st prize, \$500; 2nd prize, \$300; 3rd prize, \$200.

(4) Race Horse Start will be used.

### EVENT NO. 2

#### CIVILIANS ONLY

(1) Open to planes powered with a motor of 100 cubic inch piston displacement or less.

(2) 20 laps of 5-mile course.

(3) Prizes \$750; 1st prize, \$375; 2nd prize, \$225; 3rd prize, \$150.

(4) Race Horse Start will be used.

### EVENT NO. 3

#### CIVILIANS ONLY (EXPERIMENTAL SHIP RACE)

(1) Open to ships of all types powered with motor or motors having a total cubic inch piston displacement of not more than 510 for Class C and to ships of all types powered with a motor or motors having cubic inch piston displacement of more than 510, but not more than 800 for Class D. No pay load is required to be carried.

(2) These planes must have in their design a substantial departure from the conventional.

(3) Each entrant allowed to start shall make one or more demonstrations and continue flying in that demonstration until flagged down by Technical Committee.

(4) 10 laps of 5-mile course.

(5) Prizes \$1,600; 1st prize, \$400; 2nd prize, \$240; 3rd prize, \$160; for each class.

### EVENT NO. 4

#### PILOTS OF U. S. MARINE SQUADRON

(1) Open to attack planes only.

(2) 10 laps of 10-mile course.

(3) Individual trophy awards to the first four place winners.

(4) Race Horse Start will be used.

### EVENT NO. 5

#### CIVILIANS ONLY—275 CUBIC INCH PISTON DISPLACEMENT (FREE FOR ALL)

(1) Open to ships of all types powered with motors of 275 cubic inch piston displacement or less.

(2) 10 laps of 5-mile course.

(3) Prizes \$775; 1st prize, \$400; 2nd prize, \$200; 3rd prize, \$100; 4th prize, \$50; 5th prize, \$25.

(4) Race Horse Start will be used.

### EVENT NO. 6

#### FOR PILOTS OF U. S. ARMY ATTACK GROUPS

(1) Open to attack type planes.

(2) 120 miles—12 laps of 10-mile course.

(3) Prize: Gen. Mason M. Patrick Trophy.

(4) Race Horse Start will be used.

### EVENT NO. 7

#### FOR PILOTS OF U. S. ARMY PURSUIT GROUPS

(1) Open to pursuit type planes.

(2) 12 laps of 10-mile course.

(3) Prize: John R. Mitchell Trophy.

(4) Race Horse Start will be used.

### EVENT NO. 8

#### CIVILIANS ONLY (OX-5 RACE)

(1) Open to all type OX-5 motored ships of single ignition and two or more seats.

(2) 10 laps of 5-mile course.

(3) Prizes \$1,250; 1st, \$500; 2nd, \$400; 3rd, \$200; 4th, \$100; 5th, \$50.

(4) Race Horse Start will be used.

### EVENT NO. 9

#### CIVILIANS ONLY

(1) Open to all type ships powered with motors of more than 275 cubic inch piston displacement and not more than 510 cubic inch piston displacement.

(2) 10 laps of 5-mile course.

(3) Prizes \$1,250; 1st, \$500; 2nd, \$400; 3rd, \$200; 4th, \$100; 5th, \$50.

(4) Race Horse Start will be used.

### EVENT NO. 10

#### CLEVELAND TO BUFFALO EFFICIENCY RACE

(1) Open to all types of ships, single or multi-motored.

(2) Prizes \$3,000 and a valuable trophy; 1st, \$1,500; 2nd, \$750; 3rd, \$450; 4th, \$300. Possibly additional prizes will be announced later.

(3) All ships entered in this event must carry the gross load stated in their Department of Commerce approved type certificate and the gross load to be carried by those ships not possessing an approved type certificate shall be decided by the Contest Committee. All planes must get off within 900 feet.

### EVENT NO. 11

#### CONTEST FOR BREAKING WORLD'S SOLO ENDURANCE RECORD

(1) The start must be made from and

landing made at the Cleveland Airport within the period of time that the National Air Races are held there.

(2) Prizes: \$1,500 for a man pilot, commercial offer of \$2,500 and \$100 for each hour above record; \$1,500 for a woman pilot, commercial offer of \$2,500 and \$100 for each hour above record.

### EVENT NO. 12

#### RELAY RACE FOR CIVILIANS ONLY

(1) Open to OX-5 motored ships only—a maximum of 4 teams of 5 ships are allowed to enter this race.

(2) 60 miles—each ship to fly 3 laps of 5-mile course.

(3) Prizes: \$1,500; 1st prize to winning team, \$750; 2nd prize to second winning team, \$375; 3rd prize to third winning team, \$250; 4th prize to fourth winning team, \$125.

### EVENT NO. 13

#### CIVILIANS ONLY

(1) Open to any type of ship powered with motor of 720 cubic inch piston displacement or less.

(2) 10 laps of 5-mile course.

(3) Prizes: \$1,500; 1st, \$750; 2nd, \$375; 3rd, \$187.50; 4th, \$112.50; 5th, \$75.

(4) Race Horse Start will be used.

### EVENT NO. 14

#### RACE FOR OBSERVATION TYPE OF AIRPLANE (Liberty Engine Builders Trophy)

(1) Open to Military 2-place type plane only, powered with Liberty Motors.

(2) 12 laps of 10-mile course—average speed of better than 90 miles per hour must be maintained.

(3) Prizes: Individual trophy will be awarded to the first 4 place winners.

(4) Race Horse Start will be used.

### EVENT NO. 15

#### CIVILIANS ONLY (LIGHT AIRPLANE AND EFFICIENCY CONTEST)

(1) Open to all types of ships powered with motors of 275 cubic inch piston displacement or less. All planes must carry .02 pounds of pay load per cubic inch piston displacement of motor.

(2) 10 laps of 5-mile course.

(3) Prizes \$950 for speed and efficiency as follows: Winner in each class, \$225; 2nd, \$125; 3rd, \$75; 4th, \$50.


### EVENT NO. 16

#### NATIONAL PARACHUTE JUMPING CONTEST

(1) Each contestant will be required to jump from a minimum of 1,500 feet, landing as near as possible to a predetermined point on the airport.

(2) Two groups of jumpers will be used in the Parachute Jumping Contest: 1st group will be service jumpers selected from the Army, Navy, Marine Corps and National Guard. Second group will be civilian jumpers. Selection will be made from the civilian entrants by the Contest Committee. The two groups jump on alternate days for the first eight days and on the ninth day the winners of the first eight days compete against each other.

(Continued on next page)



# AVIATION'S EYES

## *are focused on St. LOUIS*

### *The Crossroads of the Air*



EAST to west, north to south, sweeping diagonally from one corner of the country to another, the natural aerial highways of the nation meet at the "Crossroads of the Air." Here, in the middle of the country, where transportation lines have always met—Aviation, too, has its focal center today.

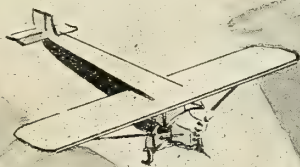
Toward this mid-continental crossing, Aviation's eyes are gazing now. In and around this natural center must come the great developments of the industry. For, since Aviation is Transportation—fast, long-distance, *straight-line* Transportation—its activity must be greatest where such transportation means the most; where the great air lanes meet, and cross, and radiate.

So, to St. Louis, key city of aerial crossroads, have come one after another of the manufacturers, the transport companies and the service organizations—here to establish their headquarters. Here to St. Louis is coming the National Aircraft Exposition of 1930, the most important Aviation event of the year. Here, too, will come more and more of Aviation's business and manufacturing interests, as the locational advantages of Aviation's Natural Center become better known and understood.

*Condensed, accurate facts regarding Aviation opportunities in the St. Louis District, and a special survey, if desired, are available on application to*  
 The INDUSTRIAL BUREAU of the INDUSTRIAL CLUB  
 511 Locust Street St. Louis, Mo.

#### "Shipments F. A. St. L."

(Flyaway, St. Louis) means arrival at destination within 5 hours anywhere inside the 500-mile St. Louis Circle, whose population exceeds 50,000,000 people.



SAINT  LOUIS

#### *In St. Louis*

1929 Gordon Bennett  
Balloon Races

1930 National Aircraft  
Show

#### THE WORLD'S ENDURANCE RECORD

broken at St. Louis, by Jackson and O'Brine, again demonstrates the superior flying weather in this area, which so contribute to make this the natural Center of Aviation.

*The* **CROSSROADS OF THE AIR**



(Continued from preceding page)

(3) All parachutes must have an inspection ticket dated within thirty days of the start of the races. An Air Service or National Guard inspection ticket for the Service or Guard jumpers and a factory inspection ticket for the civilian jumpers. Bundle type or exhibition type chutes will not be allowed to be used.

(4) Prizes: Daily prizes, \$100; 1st, \$50; 2nd, \$30; 3rd, \$20. Grand prize: \$1,000 for the last day; 1st, \$500; 2nd, \$300; 3rd, \$200.

#### EVENT NO. 17

##### CIVILIANS ONLY—OPEN SHIP RACE

(1) Open only to ships of open cockpit or mail type powered with motors of 800 cubic inch piston displacement or less.

(2) 75 miles—15 laps of 5-mile course.

(3) Prizes: \$1,300; 1st, \$600; 2nd, \$300; 3rd, \$150; 4th, \$100; 5th, \$50.

(4) Race Horse Start will probably be used.

#### EVENT NO. 18

##### CIVILIANS ONLY—AIR TRANSPORT AND EFFICIENCY CONTEST

(For Detroit News Air Transport Trophy)

(1) Open to cabin type single-motored planes only. Each plane must carry a minimum pay load of 1,000 lbs. and must get off within 900 feet and have a speed of not less than 80 miles per hour.

(2) 10 laps of 10-mile course.

(3) Prizes \$1,800, to be awarded as follows: For speed—1st, \$450; 2nd, \$270; 3rd, \$180. For efficiency—1st, \$450; 2nd, \$270; 3rd, \$180.

#### EVENT NO. 19

##### CIVILIANS ONLY (CABIN SHIP RACE)

(1) Open to all types of cabin ships powered with motor or motors of more than 800 cubic inch piston displacement. All ships to carry a pay load as per general rules.

(2) Distance 75 miles—15 laps of 5-mile course.

(3) Prizes: \$1,500; 1st, \$675; 2nd, \$375; 3rd, \$225; 4th, \$150; 5th, \$75.

(4) Race Horse Start will probably be used.

#### EVENT NO. 20

(1) Open to all multi-motored ships. Each must carry a pay load of 1,000 pounds.

(2) Distance 100 miles—10 laps of 10-mile course.

(3) Prizes: \$1,000 and a valuable trophy; 1st, \$500; 2nd, \$300; 3rd, \$150; 4th, \$50.

#### EVENT NO. 21

##### NAVY PURSUIT PLANE RACE

(1) Distance 150 miles—75 laps of 10-mile course.

(2) Prizes: Individual trophy to be awarded to the first 4 place winners.

(3) Race Horse Start will probably be used.

#### EVENT NO. 22

##### AUSTRALIAN PURSUIT RACE (SATURDAY, AUGUST 31st)

(1) Open to all types of ships powered with any motor. Using the known speed

of the various airplanes entering and the length of the course as factors, the time that each airplane should require to fly the prescribed course will be worked out, the faster planes will be handicapped and the planes so started that they should finish at exactly the same time.

(2) When one plane passes another, the plane passed must drop out of the race. If more than 15 entrants are ready to start semi-finals will be run.

(3) 15 laps of 5-mile course.

(4) Prizes: \$1,500; 1st, \$750; 2nd, \$375; 3rd, \$185; 4th, \$110; 5th, \$80.

#### EVENT NO. 23

##### NATIONAL GUARD PLANES

(1) Open to any Liberty motored plane assigned to any National Guard Air Squadron.

(2) 12 laps of 10-mile course.

(3) Prizes: \$1,000; 1st, \$500; 2nd, \$300; 3rd, \$200.

(4) Race Horse Start will probably be used.

#### EVENT NO. 24

(1) Air line distance non-stop, non-refuel contest to establish a new World's Record for long distance flight.

(2) Open to any type airplane powered with any size motor or motors. Must make one continuous flight and so take off at the proper time that it will land at Cleveland Airport between 1 and 6 p. m. any day from August 25th to September 2nd, 1929.

(3) Prize to winner \$5,000.

#### EVENT NO. 25

(1) Contest to establish a new World's Airplane Endurance Flight Record by refueling. Open to any type airplane equipped with any type motor or motors. Starts in this contest must be made from Cleveland Airport between 1 p. m. and 5 p. m. on a day commencing not earlier than August 25th and not later than September 2nd.

(2) Contestants must make continuous flight either in sight of those at Cleveland Airport or sufficiently near so that motor of contestant's plane can be continually heard, excepting when weather conditions are bad at or in the vicinity of Cleveland Airport; in that event the endurance plane may fly to a safer area, returning promptly to the vicinity of Cleveland Airport when weather conditions make it safe to fly there. Landing must be at Cleveland Airport, but contestant may land after races have ended.

(3) Prize to winner \$5,000.

#### EVENT NO. 26

(1) A free-for-all speed contest for any type of airplane equipped with any type of motor or motors. Superchargers, special fuels, or any other means may be used to increase the speed of planes entered in this race.

(2) 10 laps of 5-mile course.

(3) Prizes: \$1,500; 1st, \$750; 2nd, \$450; 3rd, \$300.

#### EVENT NO. 27

##### DEAD STICK LANDING CONTEST FOR MEN PILOTS

(1) The following prizes will be awarded each day for the contestant landing closest

to a designated mark on Cleveland Airport.

(2) 1st, \$100; 2nd, \$50; 3rd, \$25; for each day.

(3) The Contest Committee reserves the right to limit the number of entrants contesting each day.

#### EVENT NO. 28

##### LADIES' RACE

(1) Open to all type planes powered with motor or motors of more than 510 cubic inch piston displacement and not more than 800.

(2) 12 laps of 5-mile course.

(3) Prizes: \$1,250; 1st, \$625; 2nd, \$375; 3rd, \$250.

#### EVENT NO. 29

##### DEAD STICK LANDING CONTEST FOR WOMEN PILOTS

(1) This contest will be held on three different days of the races, August 29th, August 31st, September 2nd.

(2) Prizes \$175 each day: 1st, \$100; 2nd, \$50; 3rd, \$25.

#### EVENT NO. 30

##### AUSTRALIAN PURSUIT RACE FOR WOMEN (FRIDAY, AUGUST 30th)

(1) Open to all types of planes with motor of not less than 275 cubic inch piston displacement and not more than 800.

(2) 12 laps of 5-mile course.

(3) Prizes: \$1,250; 1st, \$625; 2nd, \$375; 3rd, \$250.

#### EVENT NO. 31

##### AUSTRALIAN PURSUIT RACE FOR WOMEN (SUNDAY, SEPTEMBER 1st)

(1) See Event No. 22 for details.

(2) Open to all type planes with motor of not less than 275 cubic inch piston displacement and not more than 800.

(3) Prizes: \$1,250; 1st, \$625; 2nd, \$375; 3rd, \$250.

#### EVENT NO. 32

##### AUSTRALIAN PURSUIT FOR MEN (SUNDAY, SEPTEMBER, 1st)

(1) See General Rules covering Closed Course Events for details.

(2) Open to any type plane of any cubic inch piston displacement.

(3) 15 laps of 5-mile course.

(4) Prizes: \$1,500; 1st, \$750; 2nd, \$375; 3rd, \$185; 4th, \$110; 5th, \$80.

#### EVENT NO. 33

##### BALLOON BURSTING CONTEST FOR MEN PILOTS ONLY

(1) This balloon bursting contest will be held each day during the races. There will be 4 events each day—2 ships will be allowed in the air at once and will be chosen from among the entrants for the day by chance or by specific selection of the Contest Committee. Ships of the same class must compete against each other. The classes will be 275 cubic inch piston displacement, 275 to 510 cubic inch piston displacement and 720 to 800 cubic inch piston displacement.

(2) The balloons will be sent up from two widely separated points in the field, and the ship will be allowed to dive at a balloon

(Continued on page 288)



*Behind each "Corsair"  
stands the Vought record*

● of over a decade of dominant leadership, based on advanced engineering design, precision workmanship and the unwavering policy of producing only the finest airplanes that can be built. The performance of the Vought "Corsair" is unequalled for its type. Equipped with "Wasp" engine, it is unapproached in speed, climb, and all around controllability. In other words, the "Corsair" is just the plane for the sportsman pilot, the business man and the commercial operator.

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*Division of United Aircraft & Transport Co.*

Long Island City

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*See the "Corsair" National Air Races and Aeronautical Exposition, Cleveland, Ohio*



# OIL companies choose BOEING planes ▲ ▲



Standard Oil Company's Boeing 40, dual control. Two passengers and 500 lbs. cargo. Hornet engine.



Associated Oil Company's Boeing 40, dual control. Wash engine.



Empire Oil Company's Boeing 40. Four passenger and 500 lbs. cargo. Hornet engine.

## See these Boeing Planes at the Cleveland Show

Model 40-B4—Passenger and Cargo Model 100—High Speed Sport Plane  
Model 80A—18-Passenger Tri-Motored Transport

**L**ARGE corporations buy airplanes on proven efficiency and guaranteed, not estimated, performance. They, like the five large air mail companies which use Boeing equipment to move half the nation's air mail, want "seven-day-a-week planes."

The purchase of Boeing Model 40-B4 by such companies as Standard Oil of California, Associated Oil and Empire Oil, is *another endorsement of the superiority of the Boeing combination passenger-cargo plane.*

Unusual performance has been amply demonstrated by more than six million miles of scheduled flying on the transcontinental and Pacific Coast air mail, express and passenger routes in

the last two years, under conditions varying from sea level to 12,000 feet, and from sub-zero to tropical temperatures.

*Many distinctive Boeing features make Model 40-B4 the ideal plane for many individuals and companies:* transporting company executives, salesmen or merchants to branch houses; emergency shipments, newspapers, advertising purposes, moving men and materials to points inaccessible by land, etc., etc.

Performance specifications of 40-B4, and other models from this, the largest airplane factory in America, are given below. *Write us for complete details on our various planes.*

# BOEING AIRPLANE CO.

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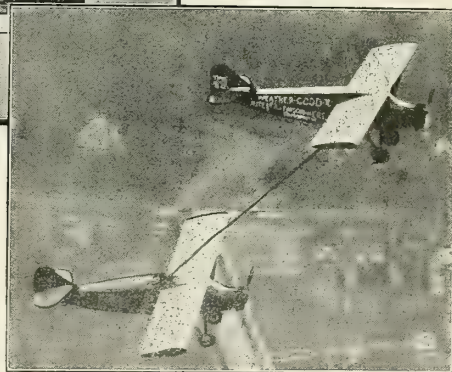
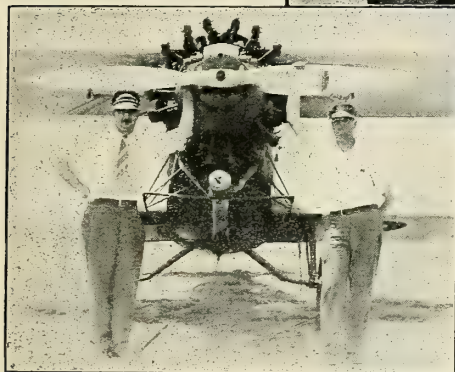
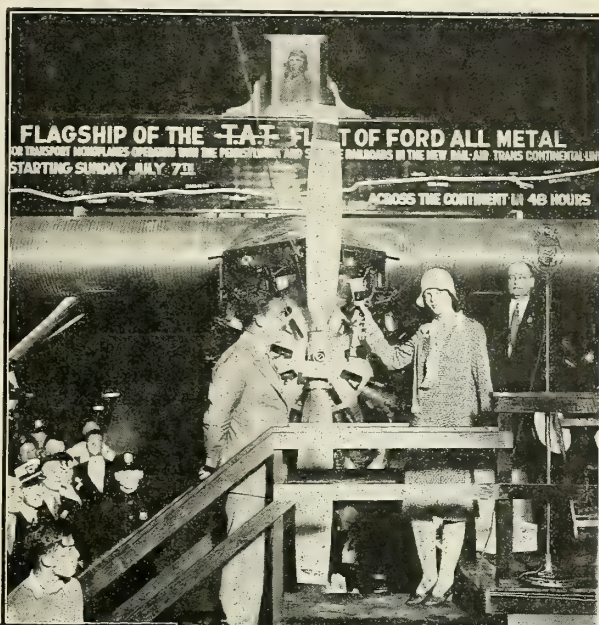
Division of United Aircraft and Transport Corporation

## Boeing Offers the Following Models for Early Delivery

{All performance figures, based on maximum payload, are guaranteed, not estimated}

	"10-B1"	"10-B2"	"95"	"100"	"201"
	Mail, cargo, 4-pass. and pilot, cabin biplane	Mail, cargo, 2-pass. and pilot, cabin biplane	High speed, large capacity, mail, cargo, sport biplane	High speed, single seater land sport biplane	Four pass. and pilot, cabin flying boat
Empty	3722 lbs.	3543 lbs.	3196 lbs.	1871 lbs.	3358 lbs.
Pay load	1253 lbs.	1436 lbs.	1600 lbs.	23 lbs.	913 lbs.
Useful load	2353 lbs.	2536 lbs.	2644 lbs.	829 lbs.	1642 lbs.
High speed	132 mph	132 mph	142 mph	165 mph	115 mph
Cruising speed	105 mph	105 mph	125 mph	140 mph	90 mph
Landing speed	57 mph	57 mph	56 mph	56 mph	52 mph
Engine	Hornet	Hornet	Hornet	Wasp	Wasp
Rate of climb (min.)	800 ft.	800 ft.	950 ft.	2,400 ft.	1,000 ft.
Service ceiling	15,100 ft.	15,100 ft.	16,000 ft.	24,000 ft.	12,000 ft.
Take-off run	550 ft.	550 ft.	540 ft.	100 ft.	900 ft.
Cruising range	500 mi.	500 mi.	650 mi.	525 mi.	450 mi.

**Write for catalog on various models.**



## *do flying men have such confidence in* **HAMILTON PROPELLERS**

**W**HEREVER you go . . . wherever men fly . . . wherever pilots groom their ships for fine performance you will find Hamilton Propellers. Why such confidence? The answer is simple. It is because they know that "props" must fit the engine and the plane . . . because they know that Hamilton Propellers are fitted scientifically to give the greatest efficiency . . . because they know that the Hamilton trademark is the stamp of the highest quality and accuracy . . . because they know that Hamilton is one of the greatest names in American aviation, and that Hamilton Propellers have for many years

maintained a leadership that has never been approached.

That is why flying men have such confidence in Hamilton Propellers . . . and why Hamilton Propellers figure in so many epochal and record-breaking flights.

Hamilton Propellers are made in wood and metal . . . A design for every combination of ship and engine . . . especially fitted through speed tests . . . accurate . . . superbly balanced . . . and strong. See the Hamilton display at the Cleveland Air Races. A complete exhibit of propellers.

# **HAMILTON PROPELLERS**

Hamilton Aero Manufacturing Company  
Division of United Aircraft and Transport Corp.

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# THE AIR SERVICES

## COAST-TO-COAST TACTICAL FLIGHT OF ARMY BOMBERS

**T**HE Second Bombardment Group of the Army Air Corps completed a flight from Langley Field, Va., to Rockwell Field, California, on August 6 in a total elapsed time of 41 hours, and a total flying time of 30 hours. The flight, made in nine LB-7 twin-engined bombers under the command of Major Hugh J. Knerr, constitutes one of the most important tactical missions performed by the Air Corps since the war, and clearly demonstrates the feasibility of reinforcing the defences on either coast by successive flights of bombardment type aircraft in less than 48 hours.

These airplanes upon arrival at San Diego were in condition to immediately perform any bombardment mission which war conditions might have required. A significant discovery of the flight, according to Air Corps officials, was that young officers can be trained within a year's time to undertake any mission to which they may be assigned. Of the eighteen officers participating in the 41-hour trip, more than half had had no experience in cross country navigation other than routine station flying. The officers of the Group have recommended that civilian aircraft servicing agencies be given encouragement to equip themselves adequately for the demands of such military operations.

Details of the flight, which started August 5, are described in the following report sent to the War Department:

"The flight from Langley field to St. Louis was accomplished between 6 a.m. and 2 p.m. At St. Louis the weather forecast was severe, with thunderstorms due in Missouri. In order to eliminate this hazard, the group took off for Kansas City as soon as servicing was completed, arriving at Kansas City at 7:30 p.m. August 5.

"The Transcontinental Air Transport kind-

ly offered its services at Kansas City, and there it was learned that the weather would probably be fair for the flight to Albuquerque that night. Thunderstorms were present along the route, but it was not anticipated they would cut across the course.

"The group left Kansas City at 10 p.m. on a direct compass course for Albuquerque. The lighted airways from Kansas City to Wichita and to the east could be seen for the first two hours, after which no check was attempted on towns along the route.

"Severe thunderstorms were encountered after leaving the vicinity of Wichita, moving from the northwest, two of them crossing our route so as to make it necessary to pick our way between adjacent storms. Dead reckoning had to be resorted to in order to be certain of hitting our destination at Albuquerque at daylight. However, deviation from our course on account of the weather lengthened the time on the route to such an extent that daylight overtook us somewhere in the vicinity of Clovis, New Mexico.

"During this section of the flight radio communication between ships and ground was successful for the first time, due to modern equipment received a short time before leaving.

"The squadron commander was in constant communication with his flight leaders, who, in turn, were able to communicate with members of their flights.

"On some occasion ships were apparently in trouble or straggling; however, assurance that everything was all right was soon evident. Likewise during the day flights between Langley field and St. Louis, and between Albuquerque and Rockwell field, weather reports from the Transcontinental Air Transport System, from the air mail between New York and Chicago, and the radio beacon at

Scott field (which was completed only two hours before we used it) were received, and maximum use made of this information.

"Shortly after daylight we crossed a railroad and picked up the name on the station, which, with the aid of an ordinary map, fixed our course position on the route for Albuquerque, where we arrived at 7:45 a.m. August 6. Here the facilities of the Transcontinental Air Transport were available to the Air Corps, and, in addition, the local authorities had placed nine 550-gallon tanks of gasoline in shallow holes in the ground. These tanks were placed 100 feet apart so the airplanes could be taxied over them, and we were thus enabled to pump the gasoline into the ships' tanks by means of the pump installation in the airplane.

"In order to extend the cruising radius of these LB-7's, six 40-gallon tanks were slung on the bomb shackles in the bomb bay. There, gas tanks could be dropped in case of forced landing.

"At St. Louis the local authorities had put their men at our disposition and servicing was accomplished in a very short time. We were dependent upon our own crews to aid us at Albuquerque. Having only two men to handle almost 600 gallons of gasoline, 35 quarts of oil, check motors and make airplane inspection, per ship, caused a delay until noon before we were able to take off. This incident impressed itself very thoroughly on all concerned as being one which must be taken care of in case it is necessary to dispatch tactical units across the continent in successive waves in a minimum length of time. Our experience was that a two-hour interval is sufficient if trained personnel is available at the servicing point. Squadrons could be dispatched through stations such as this on a dispatcher schedule from their home stations to widely scattered points without any difficulty, if this trained personnel were available.

"Leaving Albuquerque at noon, flying a compass course for San Diego, we arrived

(Continued on next page)



Nine Keystone LB-7 bombers took part in the 41-hour transcontinental flight of the Second Bombardment Group



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## Elements of Aviation An Explanation of Flight Principles

by Colonel V. E. Clark, formerly Chief Aeronautical Engineer, U. S. Army. 192 pages, 24 illustrations, \$3.00.

Colonel Clark is a world famous aircraft designer, the originator of the airfoils used in the most successful planes in both America and Europe. His new book will give anyone a clear understanding of the fundamental reasons why an airplane flies, why it is controllable or uncontrollable in various attitudes and conditions—in short, "why an airplane does what it does." It will prove practically useful not only to students of aeronautical engineering and beginners but also to veteran



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## Simple Aerodynamics and the Airplane

by Charles N. Monteith, Chief Engineer, Boeing Airplane Co.; 3rd edition revised by Colonel C. C. Carter, U. S. Military Academy, West Point. 418 pages, 211 illustrations, \$4.50.

A completely revised and enlarged edition of a famous introductory textbook widely used in ground and flying schools, in colleges, technical schools and universities. It is ideally suited to home-study use.

## Airplane Stress Analysis

by Alexander Klemin, Professor of Aeronautical Engineering Daniel Guggenheim School of Aeronautics, New York University. 277 pages, 165 illustrations, \$7.00.



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explains the principles of applied mechanics involved. In concise, easily usable form, data on materials of aircraft construction to which the calculator must frequently refer, are assembled for convenient reference.

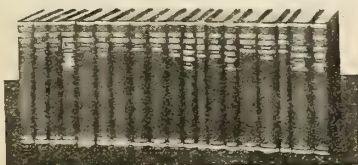
## Aircraft Instruments

by Herbert N. Eaton, and other experts of the Aeronautic Instruments Section, United States Bureau of Standards, 269 pages. 68 illustrations. Price \$5.00.



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Describes more than 175 types and makes of aircraft instruments. Gives not merely mechanical explanation of each, but a summary of the principles upon which it operates and, wherever possible, opinions as to its advantages and disadvantages, also points out limitations and possible errors to which each class of instrument is subject. Among the instruments described are altitude, attitude, air-speed, and engine revolution indicators; oil and radiator thermometers, gasoline gauges, earth inductor compass, sextants, banking indicators, etc., etc. Provides practical information on installation and maintenance of instruments which will prove particularly helpful to airplane mechanics. Particularly useful to engineers and designers in selecting the most suitable instruments for particular purposes.



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knowledge and training. Thousands of copies are in use in government and private flying schools throughout the country. Leaders in every branch of aviation endorse them. Space permits us to describe only seven of the twenty-two volumes of the series that are now ready, but these seven books provide the essential foundation information that you want to have no matter in what branch of aeronautics you may later decide to specialize. Just check those you want to see and mail the coupon below—the books will be shipped at once, delivery charges prepaid by us, for your inspection.

## Practical Flying

### A Training Manual for Airplane Pilots

by Major Byron Q. Jones, Air Corps, U. S. Army. 210 pages, 6 illustrations. Price \$3.00.

This new book, by a famous army flyer, contains the practical information that everyone interested in aviation as a career wants. It is so plainly written, so specific and to the point that any beginner can understand it. First Major Jones outlines the physical and mental characteristics that you should have if you wish to become a pilot. Then he describes all the parts of a plane, instruments, etc.; discusses maneuvers in the air, defines and explains the many technical and slang terms that are used at airshows. From this he proceeds to clear and concise answers to the hundreds of questions that student pilots ask—information that is essential for a proper understanding of piloting.



## Aeronautical Meteorology

### What the Airman Must Know About Atmosphere and Weather Conditions

by Willis Ray Gregg, Meteorologist in Charge of Aerological Investigations, United States Weather Bureau. 114 pages, 49 illustrations. Price \$2.50.

Every pilot and airport official should know specifically and thoroughly how to forecast weather from local observations. This famous book will supply you in simple and convenient form with just the information you need to understand weather maps at a glance and to use local observations for immediate forecasts of weather possibilities with their application to prospective flying conditions. Covers: weather forecasting from clouds; average height of clouds in each class; variation in direction and velocity of winds with change of altitude; characteristics and dimensions of thunder-storms, visibility; weather-map making and reading; etc., etc.



GREGG

## Engineering Aerodynamics

by Lieut. Walter S. Diehl (C. C.) U. S. N.; Scientific Section, Bureau of Aeronautics; Member of Aerodynamics Subcommittee, N. A. C. A. 282 pages, 159 illustrations, Price \$7.00.

Practical information on aerodynamics, presented in forms suitable for direct application by aircraft designers and advanced students of aeronautical engineering. Large amount of data is condensed in working diagrams and equations, many important calculations are illustrated by practical examples. Shows how modern theories of lift and drag are applied in everyday design problems. Gives methods for designing control surfaces; explains advantages and limitations of airplane model tests and shows how data are interpreted. Gives detailed methods for calculating and estimating performance, making performance tests, etc., etc.



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(Continued from preceding page)

there at sunset with eight of the original nine bombers, one having been forced out at Winslow, Ariz., shortly after leaving Albuquerque. Upon landing, the airplanes were inspected, and necessary arrangements made for accomplishing any mission which might be assigned to them. One flight of three airplanes with simulated bombs was dispatched upon a bombing mission to the seaward within a half hour after landing. All airplanes were found to be in condition for immediate use upon arrival at Rockwell Field. That the crews of the planes were also equal to any emergency was demonstrated by the bombing mission executed within one-half hour after landing."

On receipt of the report, General Summerall, Chief of Staff, sent the following telegram to the commanding officer, Maj. Knerr:

"I take great pleasure in extending to you, and the officers and men of the second bombardment group, my commendation on your flight from the east to the west coast completed August 6, 1929, the account of which I have just read with great interest. This flight not only indicates the high degree of training and professional ability on the part of the officers and men concerned, and a most satisfactory condition of equipment; but it affords most illuminating data on the possible operations of such groups in time of emergency—Summerall."

The personnel participating in this round-trip transcontinental flight was as follows:

Plane No. 41: Captain S. L. Palmer, Lieut. L. F. Harman, Mr. Sgt. Granger, Staff Sgt. Meyers.

Plane No. 42: Major Hugh J. Knerr, Lieut. F. B. Kendall, Sergeant Wilson, Staff Sgt. Miller.

Plane No. 43: Capt. C. E. Rust, Lieut. M. M. Bernsido, Staff Sgt. DeRosset, Mr. Sgt. Budoff.

Plane No. 44: Lieut. H. W. Beaton, Lieut. M. Huggins, Staff Sgt. West, Private McDonald.

Plane No. 45: Lieut. George W. Hammond, Lieut. F. L. Fair, Staff Sgt. Martin, Private Delavin.

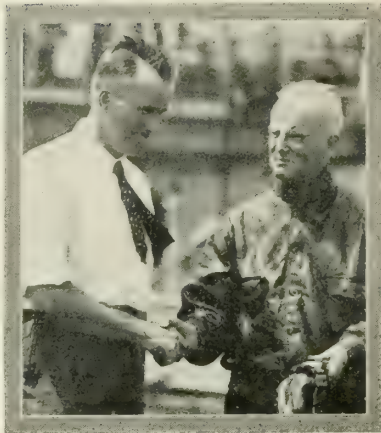
Plane No. 46: Lieut. A. J. K. Malone, Lieut. W. Higgins, Staff Sgt. McMinanen, Private Ruth.

Plane No. 47: Lieut. W. R. Wolfenbarger, Lieut. E. M. Day, Sergeant Cobb, Private Boyert.

Plane No. 48: Lieut. J. W. Adams, Lieut. W. R. Agee, Mr. Sgt. Taylor, Private Cushing.

Plane No. 49: Lieut. E. J. Martin, Lieut. W. C. Bentley, Sergeant Smith, Private Tuzenslar.

The return flight of the Squadron from Rockwell Field will be made in easy stages, stops to be made at Oakland, Calif.; Salt Lake City, Utah; Cheyenne, Wyo.; Denver, Colo.; Kansas City, Mo.; Dayton, Ohio; and Cleveland, Ohio. At Cleveland the pilots will participate in exhibition flights during the National Air Races to be held there between August 24th and September 2nd, after which they will return to Langley Field.



P & A Photo

Lieut. Al Williams, American Schneider Cup Race entrant, and Admiral Moffett

PRESIDENT HOOVER has appointed Commander J. H. Towers, U. S. N., to be a member of the National Advisory Committee for Aeronautics.

## ARMY OFFICERS TO FLY AT AIR RACES

THE War Department recently announced the names of the Air Corps officers who will participate in the National Air Races to be held in Cleveland from Aug. 24 to Sept. 2. Those who will fly at Cleveland are:

From Fort Crockett, Texas—Major John H. Jouett, Captain Horace N. Heisen, 1st Lieut. James T. Cury, 1st Lieut. George A. McHenry, 1st Lieut. John G. Moore, 2nd Lieut. Walter S. Lee, 2nd Lieut. Elmer P. Roseo, 2nd Lieut. Reginald Heber, 2nd Lieut. George F. Kinzie, 2nd Lieut. Julius T. Flock, 2nd Lieut. Samuel J. Simonton, 2nd Lieut. Otto C. George, 2nd Lieut. Ivan M. Palmer, 2nd Lieut. George H. McNair, 2nd Lieut. George R. Acheson, 2nd Lieut. Francis M. Ziegler, 2nd Lieut. Robert D. Johnson, 2nd Lieut. William L. Lee.

From Selfridge Field, Mich.—Major Ralph Royce, Captain Victor H. Strahm, 1st Lieut. Harry A. Johnson, 1st Lieut. Paul W. Wolf, 1st Lieut. Cecil E. Henry, 2nd Lieut. Richard E. Cobb, 2nd Lieut. Hoyt L. Prindle, 2nd Lieut. Kenneth R. Rogers, 2nd Lieut. Edward B. Underhill, 2nd Lieut. John F. Egan, 2nd Lieut. Robert L. Schoenlein, 2nd Lieut. Aubrey L. Moore, 2nd Lieut. Ernest K. Warburton, 2nd Lieut. John A. Winefordner, 2nd Lieut. Paul B. Wurtsmith, 2nd Lieut. Edward R. French, 2nd Lieut. Ralph C. Rhuby, 2nd Lieut. William M. Morgan, 1st Lieut. Robert D. Moore and 2nd Lieut. Homer L. Sanders.

From Langley Field, Va.—Major Hugh J. Knerr, Captain C. E. Rust, Captain S. L. Palmer, Lieut. George W. Hammond, Lieut. E. J. Martin, Lieut. H. W. Beaton, Lieut. J. W. Adams, Lieut. W. R. Wolfenbarger, Lieut. A. J. K. Malone, Lieut. F. B. Kendall, Lieut. M. M. Bernsido, Lieut. L. F. Harman, Lieut. F. L. Fair, Lieut. W. C. Bentley, Lieut. M. Huggins, and Lieut. W. H. Agee.

## NAVY'S ALL-METAL DIRIGIBLE READY

THE ZMC-2, the all-metal dirigible being constructed by the Detroit Aircraft Corporation at Grosse Isle, Mich., is nearing completion, and will be tested the latter part of August, according to a recent report of the Navy Department. Capt. W. E. Kepner, winner of the 1928 Gordon Bennett balloon trophy, will test the ship, which was designed to prove the practicability of all-metal balloon construction.

The new airship will be smaller and stronger than the usual blimp. It will be 150 feet long and 53 feet in diameter, and will contain 200,000 cubic feet of helium gas. Though the new airship is comparatively small for a dirigible, it is unique among lighter-than-air craft of the world, and in it are incorporated three distinct aeronautical innovations: all metal construction, being the world's first all-metal dirigible; a new method of control, and an unusually low fineness ratio.

The hull is entirely of metal, being made of a thin, strong sheet aluminum alloy known as alclad. Light fins supplant the usual rudders and elevators for controls. The pair of fins on each side of the hull serve as elevators, and the top and bottom pairs as rudders. Its comparatively thick body is designed to afford great strength in combination with maximum lift and ease of control. With a crew of four, it is expected to have a speed of 62 miles per hour and a flight radius of more than 600 miles.

Being a single cell, the ZMC-2 is to be filled by replacing the air with carbon dioxide, which, in turn, will be replaced by the helium gas.

## NEW AIRPLANE RADIO RECEIVER FOR ARMY

THE Signal Corps has developed a new radio receiver for use in aircraft, which is described as meeting the four important requirements for an aircraft set—light weight, ease of installation, compactness, and simplicity of operation. It is described as a 5-tube set, known in the Army as type VT-5, the circuit being as follows: a coupling tube, a stage of tuned radio frequency, a regenerative detector, and two stages of audio-frequency amplification.

The receiver is uni-controlled and its operation is simple. The coupling tube has been employed in such a way that variations in the characteristics of the antenna, such as occur as the result of the swinging of a trailing-wire antenna when an airplane is maneuvering, will not react on the tuned circuits of the receiver.

The regeneration control has been so designed that the receiver can be made to enter oscillation smoothly without electrical backlash throughout the range of the receiver. The receiver covers a frequency band of 250 to 1,500 kilocycles and three sets of plug-in coils are employed, covering, respectively, the following ranges: 250 to 400 kilocycles, 400 to 850 kilocycles, and 850 to 1,500 kilocycles.

(Continued on page 136)





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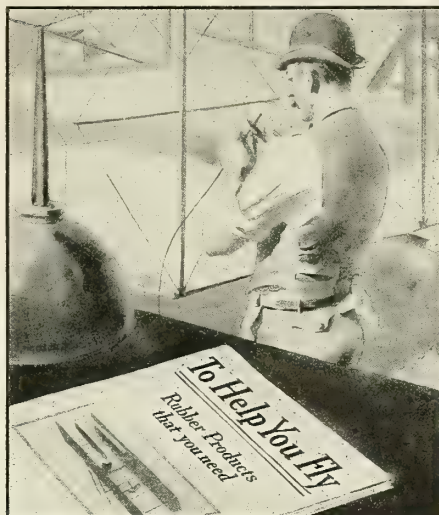
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Heavier tires soon followed and in 1910 there was published an advertising folder which was entitled "To Help you Fly" and which listed three sizes of airplane tires in addition to other flying accessories.

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(Continued from page 132)

## MEDICAL OFFICERS NAVAL AIR SERVICE

TWO groups of Navy medical officers have been given training in aviation medicine, according to the bulletin issued recently by the Bureau of Navigation. These include medical officers qualified in aviation medicine, or flight surgeons, and medical officers qualified to conduct aviation physical examinations.

The first group are specialists who have taken a basic course in aviation medicine at the Naval Medical School, followed by further training, including flight experience, at the Naval Air Station, Pensacola, Fla., or who have been given other special instruction in the subject, or have had considerable experience with active aviation units.

The second group is composed of medical officers who have completed the basic course in aviation medicine at the Naval Medical School, but have not proceeded further in the specialty. All medical officers ordered to the school for instruction are now given this course and all medical officers who have completed this course are fully qualified to conduct aviation physical examinations.

Flight surgeons are assigned to large aviation activities and to administrative and training duties. The duty these specialists have been trained to perform does not warrant their assignment to every station that may have a few planes attached, or at which it may from time to time be necessary to conduct aviation physical examinations.

THE following medical corps reserve officers graduated at the school of aviation medicine, Brooks Field, Tex., on July 31, after having satisfactorily completed a course given for the training of medical officers as flight surgeons: Lieut. Col. Serge Androp, Maj. William C. Keller, Capt. Richard H. Harrison, Capt. Ernest G. Tillmans, Capt. Roy E. Whitehead, Capt. John R. Nicholson, 1st Lieut. Joel L. Cochran, 1st Lieut. Frederick K. Sauer, 1st Lieut. Herbert J. Rudi, 1st Lieut. Philip McCaleb, Jr., 1st Lieut. Charles E. Nagel, 1st Lieut. Kenneth P. Jones, 1st Lieut. Harry Burns, 1st Lieut. Jacob J. Potter, 1st Lieut. Frank H. Prior, 1st Lieut. Clarence W. Hardy, and 1st Lieut. Robert N. Smith.

Lieut. Comdr. Price Leaves Radio Section

LIEUT. Comdr. A. I. Price, U. S. N., who has been in charge of the radio section of the Bureau of Aeronautics for the past three years, recently received orders for sea duty and is assuming command of a patrol plane squadron, Vp-8S, recently organized and attached to the aircraft tender, U. S. S. *Wright*, in the scouting fleet. He is being relieved by Lieut. Comdr. D. B. Duncan, U. S. N., who previously has been in command of an observation squadron of the battle fleet on the Pacific Coast.

During Lieut. Comdr. Price's tenure of office in the Navy Department, he has initiated or sponsored the following projects in aircraft radio development: establishment of

aviation weather and movement report net on Navy airway between Hampton Roads, Va.; Washington, D. C., and Lakehurst, N. J.; radio power supply driven from main aircraft engine; emergency radio power equipment driven by lightweight gasoline engine; a portable radio test set for use aboard ship and at naval air stations; shielded spark plugs to be used in connection with ignition shielding to eliminate disturbances in aircraft radio receivers; an extremely light-weight radio set for fighting planes; modernization of the radio equipment on the U. S. S. *Los Angeles*, and a layout of the radio requirements for the two new airships, ZR-4 and ZR-5; aircraft radio compasses for planes and airships, and equipment for the Navy's new long-range patrol plane program.

## FLYING CROSS TO FOUR ARMY FLIERS

LIEUTENANT JAMES H. DOOLITTLE, the first aviator to cross the continent within an elapsed time of twenty-four hours, and three other officers of the Army Air Corps were recently awarded the Distinguished Flying Cross. In addition, Lieutenant Doolittle was awarded the Oak Leaf Cluster for distinguished research.

The other officers who shared in the awards are Captain Lowell H. Smith, leader of the Army's around-the-world flight, and a pioneer in the practice of refueling in mid-air; Lieutenant J. Paul Richter, another pioneer in refueling tests; and Lieutenant Harry A. Sutton, for extraordinary achievement in testing the spinning qualities of a plane.

The award of the Oak Leaf Cluster came to Lieutenant Doolittle for his achievements during March, 1924, when he performed "a series of acceleration tests requiring skill, initiative, endurance and courage of the highest type."

## NAVY OFFICERS FOR PENSACOLA CLASS

THE following Navy officers have been selected for aviation training at Pensacola for the class to be convened in September, 1929, by the Navy Department: Lts. Robert C. Brown, John A. Sedgwick, Lyman A. Thackerly; Lts. (jg) Henry T. Brown, Philip R. Coffin, George W. Evans, William J. Mullins, Woodward Phelps, Henry T. Read, William H. Shahan, Curtis S. Smiley, Harry Wagner, Hunter Wood, Jr.; Ensigns, Gerald R. Dyson, Edmund E. Garcia, Etheridge Grant, William Y. C. Humes, Jr.; Seymour A. Johnson, Sam Pickering and Calvin E. Wakeman.

### Training Manual 2170-45

DUTIES of an airship coxswain in the Air Corps were described in Training Manual 2170-45, published by the War Department recently. These duties include ascertaining flight plans and the condition of the ship to realize them, calculations of fuel, supplies, and equipment required, inspection before take-off, and check up during flight, and the keeping of a daily weight-off record.

## LARGE CAMERA TESTED BY AIR CORPS

THE United States Army Air Corps at Wright Field, Dayton, Ohio, just completed tests on the world's largest aerial camera, known as the K-7A. This camera, developed to obtain large ground details from high altitudes, weighs 130 pounds. The picture it takes measures 9 by 18 inches. It carries a roll of film 150 feet long and 9½ inches wide. Its operation is fully automatic, and it possesses an automatic registering device by which the elevation of the plane, the time, date and the number of the negative are noted on the film. This camera is electrically heated so that it will function at the below-zero temperatures of the highest altitudes to which the camera is taken. The first photograph with the new camera was taken by G. A. Magnus, piloted by Lieut. J. F. Phillips, at an altitude of 18,300 feet.

### Radio Equipment on the New Navy Dirigibles

THE most powerful radio equipment ever used in a dirigible will be mounted in the two navy \$5,000,000 dirigibles now under construction in the hangars of the Goodyear-Zeppelin Corporation at Akron, Ohio. The two ships, the ZRS-4 and the ZRS-5, which will be completed about April, 1931, will each carry wireless facilities costing about \$50,000. They will have a communication range of 8,000 miles and will use two transmitters and two receivers.

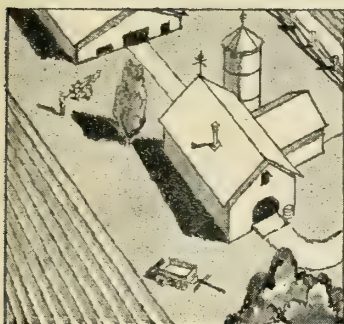
A radio compass also will be installed on each of the aircraft. Power for the sets will be generated by one of the eight engines comprising the power plant of the ship, and the engines will be shielded so as to minimize disturbance to reception.

## ROOF LANDING PLATFORM

A REVOLVING and tilting landing platform designed to make possible the landing of airplanes on top of buildings is being tested by the Army Air Corps.

The device consists of a revolving platform 60 feet wide and 210 feet long, which permits pilots to take off into the wind. It can be so maneuvered that a slant of 25 degrees is possible. When planes are taking off, the platform is tilted; and when released, the plane rolls down the incline, aided by force of gravity. In landing, the airplane lands at the foot of the incline and immediately is met by a series of spring cable retarders, so designed that they catch the speed of the plane without affording a tipping hazard. A huge reversible fan is also included which creates a gigantic suction of sufficient power to keep the plane from bounding away after landing.

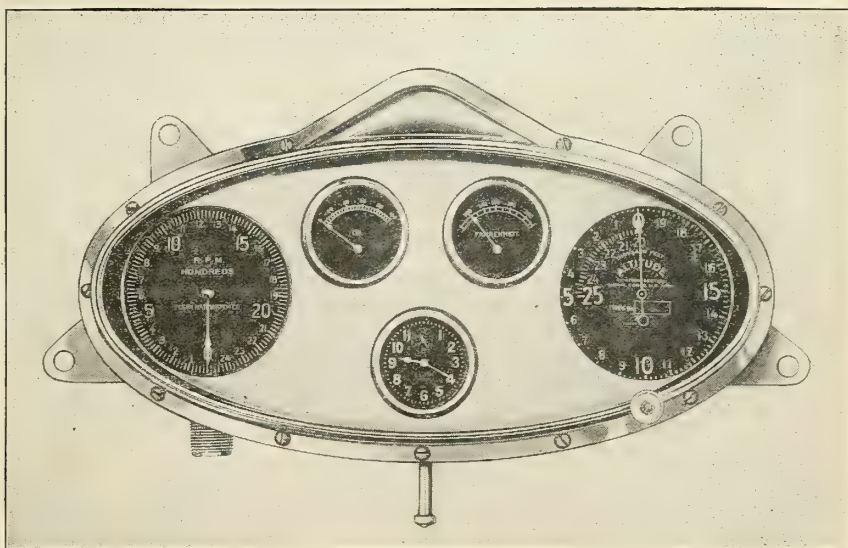
FLYING amphibian planes, Major General James E. Fechet, chief of the Air Corps, Captain Ira C. Eaker, and Lieutenant Elwood Quesada, with members of their families took off from Bolling Field on July 14 for a month's trip in Canada. They are fishing and exploring in the lake country west of Hudson Bay.



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The old days of building an airplane in the barn, covering its deficiencies with a few coats of paint . . . that's ancient history . . . ELGIN is building instruments in keeping with the finish and luxury of today's aircraft. Take this Unit Control Board, for instance. Chromium-plated frame, any color of panel with your trademark on it if you wish, indirect illumination to guard the pilot's eyes from glare, a wide assortment of instruments to select from, and all under one non-shatterable glass. You can buy a Unit Control at no greater cost than instruments bought separately and haphazardly . . . The accuracy and reliability of the individual instruments which comprise these Avigo panels have been proved and reproved in years of use by the U. S. Army and Navy Air Services.



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# DEPARTMENT OF COMMERCE



## *"The Golden Eagle Monoplane is one of the*

See the two Golden Eagle models at the Cleveland Show. The Kinner powered "Junior Pursuit" will be on the field for demonstration flights and the Le Blond "Chief" at our booth in the exposition hall. These high wing, dual controlled monoplanes are the snappiest and most neatly streamlined planes selling at anywhere near so low a figure. ¶ No finer performing ship in the light plane class has ever been built. The Golden Eagle has been developed with every consideration and thought for the production of

a high grade training plane and is sold with the guarantee to land at less than 30 m.p.h. at sea level. Construction features include direct tubing aileron control, adjustable stabilizer, oleo type landing gear, the installation of nationally recognized power plants, and the highest type of skilled workmanship. Beautiful finishes in different tone paints are optional at no additional cost. ¶ With a Kinner motor

the Golden Eagle will do 135 m.p.h. wide open and will climb 1500 ft.p.m.; with the Le Blond it has a high

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 Simmons Aircraft Corporation,  
 Los Angeles, California.  
 Sam White, Fairbanks, Alaska.  
 Frank Pool, Dorchester, Mass.  
 West Coast Aviation Incorporated,  
 Seattle, Washington.  
 Frank Free, Phoenix, Arizona.  
 Graham Air Service, Bellingham,  
 Washington.

## GOLDEN EAGLE AIRCRAFT CORPORATION

# CERTIFICATE NUMBER 202

**THE ART GOEBEL SCHOOL OF FLYING**

**ART GOEBEL AVIATION COMPANY, INC.**

**DIRECTORS**

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CONRAD W. HANCOCK

HERBERT W. WOOLY

WILLIAM L. NATHAN



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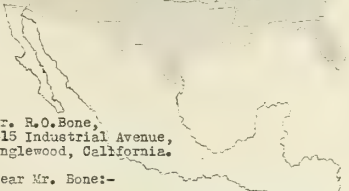
WILLIAM J. PETERSON

THOMAS C. GOEBEL, JR.

KANSAS CITY  
MISSOURI

AUGUST 9, 1929



Mr. R.O. Bone,  
415 Industrial Avenue,  
Inglewood, California.

Dear Mr. Bone:-

I am greatly impressed with the performance and ease of control of the Golden Eagle Monoplane. It is one of the finest light ships I have ever had the pleasure of flying.

With your good business organization and highest type of workmanship your success is assured.

Sincerely yours,  
*Arthur C. Goebel*  
Arthur C. Goebel

ACG:EB.

## *"finest light ships I have ever flown"—Goebel*

speed of 125 m.p.h. and a climb of 1200 ft.p.m. Bobbie Trout, West Coast aviatrix, is a very enthusiastic Golden Eagle endorser. It was in one of the former models that Miss Trout twice broke the Solo Endurance Record for Women. ¶ When Art Goebel landed the Golden Eagle recently, after "giving it the works," his expressions of satisfaction awarded this new sport and training plane the highest endorsement a manufacturer might receive. And who is in a better position than Colonel Goebel to pass judgment

on an airplane's flying qualities? ¶ We are now in production and expect to close out all territory assignments at the Air Races and Show. Some valuable dealer and distributor franchises are still open for those who can qualify. We will take a limited number of orders at \$3650, Le Blond motor, and \$3775, Kinner motor; f.o.b. fly away. Both ships at the Show will be sold — first come first served. ¶ Your inquiry will receive immediate and individual attention.

### ART GOEBEL

Colonel Arthur C. Goebel—pilot of the "Woolaroc," winning plane in the Dole races across the Pacific; pilot of several record-breaking transcontinental flights and now president of The Art Goebel School of Flying—has endorsed the new Golden Eagle. We are proud to offer his endorsement as recommendation for the performance of our new "Chief."

## 415 INDUSTRIAL AVE., INGLEWOOD, CAL.



# TECHNICAL

## NOTES ON A FAMILY OF SIMILAR FLYING BOATS

THE enlargement of landplanes is handicapped to a great extent by the present state of technical development and more particularly by the difficulties of proper landing gear design to permit safe operation of landing and taking off. In that respect the enlargement of seaplanes does not present any difficulties; on the contrary, it has been repeatedly shown that the enlargement of seaplanes leads to various improvements and it is the purpose of this article to present the data of construction and performance of a family of four flying boats of widely different sizes, all thoroughly tried and tested. In addition there is given calculated data of construction and performance of the Dornier Do.X, a large flying boat which was recently completed and test flown. To make the comparison clear, the flying boats selected for this article were fitted with air-cooled engines and as little different as possible in type of construction, all metal except for part of the covering of the wing, tail and aileron surfaces. All have stump wings (sponsons) introduced by me ten years ago, and are all of semi-cantilever high wing construction. The engines are installed above the wings and in multi-engine boats are in tandem. The hulls are of duralumin, and the spars and highly stressed parts are of high tensile steel. Table 1 gives the comparative data on five types.

I shall first give a brief general descrip-

Extract from *Aeronautical Reprint No. 33*  
Royal Aeronautical Society, London, Eng.

By Dr. C. Dornier

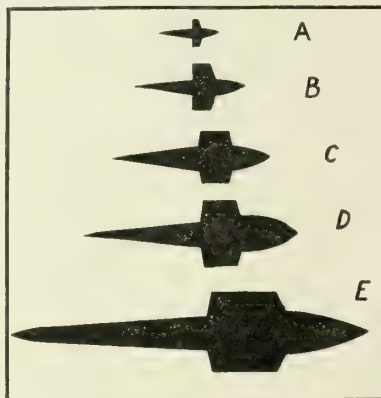


Figure 1.—Comparative sizes of hulls of the flying boats under comparison, with reference to their common points and to the unavoidable differences to be noted. Although all are equipped with air-cooled engines there are, of course, certain constructional and aerodynamical differences which must be kept in mind.

In the accompanying table 1, A is a flying boat with an 80 horsepower Siemens-Halske engine weighing about 1.75 kilograms per horsepower, B and C have both 450 horsepower Jupiter engines weighing only .74 kilograms per horsepower. A has a tractor propeller, B a pusher propeller. D and E are equipped with 500 horsepower Jupiter engines weighing .79 kilograms per horsepower, practically the same weight per horsepower as the engines of B and C, but the slower running propeller resulting in more favorable aerodynamical conditions. The engines are installed differently. The engine cradle of A is built into the wing

structure, while that of B is fastened at three points and is quickly detachable. Type C, generally known as the "Dornier-Wal," has the engines installed in tandem. Type D is known as the "Super-Wal," and its distinctive feature is the installation of four engines, two pairs in tandem. Type E is a farther and higher development of the previous type. It has sponsons and main wings of semi-cantilever construction. The engines are installed in pairs in tandem above the wing. Unfortunately the construction of the wings is not quite the same in the flying boats under comparison. Type A has folding wings covered with sheet aluminum to the back spar (so-called "stressed covering"); from the back spar to the trailing edge fabric covering is used. The spars are of duralumin. Flying boats B and C have similar spar construction, but in high-tensile steel. Type B has box ribs of pressed and flanged duralumin sheet and duralumin plating. Type C has framed ribs of duralumin and fabric covering except over the parts of the wings exposed to the airscrew blast. Type D has wings in three parts for ease of transport, consisting of the nose piece, the middle piece, and the trailing edge piece. The nose piece and middle piece are covered with duralumin, while the trailing portion is fabric covered.

The construction of the E type differs

(Continued on next page)

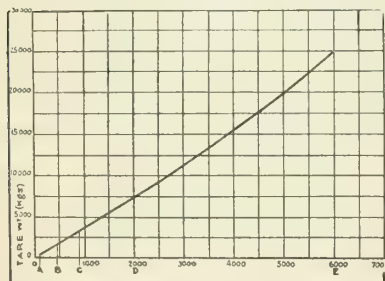


Figure 2.

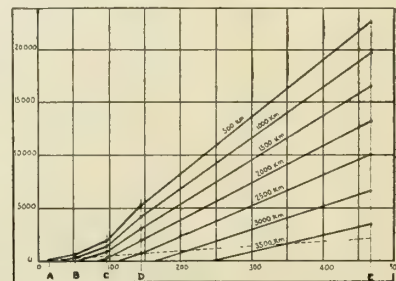
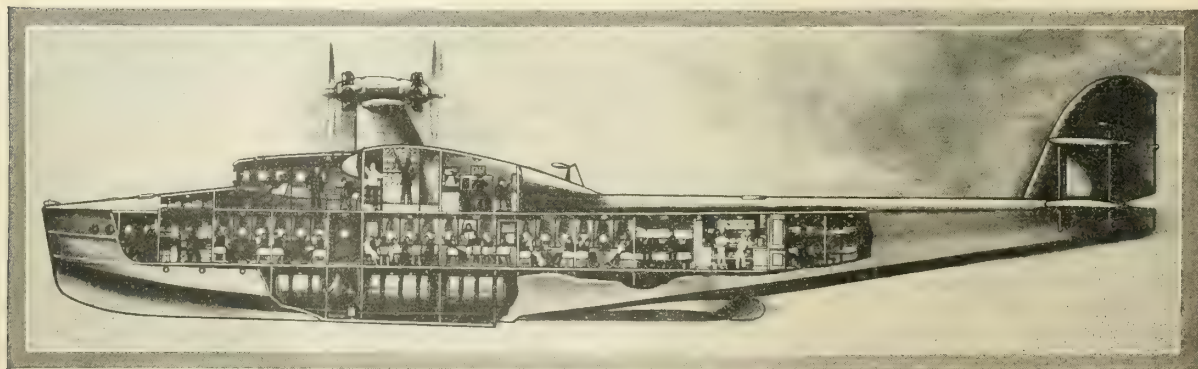


Figure 3.



Sectional drawing of the 100-passenger Dornier Do.X showing the interior arrangement of the hull

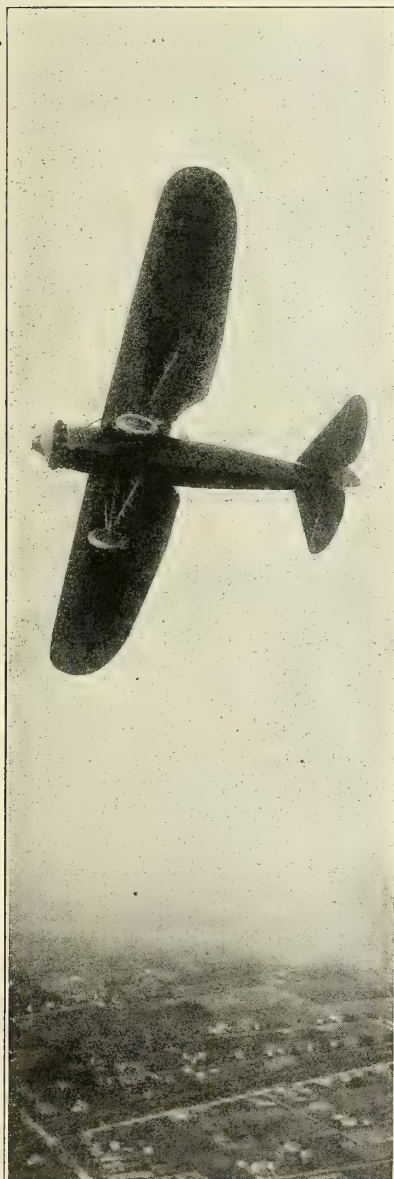
# Davis Sales ARE MADE IN THE AIR

It is an interesting fact that every Davis V-3 Monoplane has sold itself by performance.

Equally significant is the fact that the orders which have been placed for Davis V-3 Monoplanes have been placed *not* by inexperienced fliers, but by fliers of long experience.

The Davis V-3 Monoplane is the kind of a plane that fliers everywhere have been wanting—but cannot believe has been produced, until they actually fly the V-3.

It is staunch and rugged—economical to maintain and operate—thoroughly modern from nose to tail—that much you can tell by an inspection on the ground. But when you take it off and land it yourself—when you sense its unusual stability in rough weather—when you test the remarkable control at stalling speeds



See  
our *Exhibit at the*  
CLEVELAND AERONAUTICAL  
EXPOSITION

—then you will realize that the Davis V-3 is an ideal airplane.

We will try to arrange an early demonstration for you if you write.

Many rich territories are still open. Responsible dealers are invited to write for complete details of the Davis Franchise.

DAVIS AIRCRAFT CORPORATION  
Richmond, Indiana

## PERFORMANCE (Actual)

Service Ceiling.....	10,000 feet
High Speed.....	95 M. P. H.
Landing Speed.....	38 M. P. H.
Cruising Speed.....	80 M. P. H.
Climb.....	700 ft. per minute
Fuel Consumption at Cruising Speed.....	4-1/2 gallons per hour
Cruising Range.....	350-400 miles

\$2965

*Flyaway at field*

Complete  
with LeBlond 60 H.P.  
Radial Engine

DAVIS  
V<sub>3</sub>

# MONOPLANE

A TWO-PLACE HIGH-WING MONOPLANE — «THE AMERICAN MOTH»



Table 1

Type	A	B	C	D	E
Name	Libelle	Do. E	Wal	Superwal	Do. X
No. of engines	1	1	2	4	12
Engine type	Siemens	Jupiter	Jupiter	Jupiter	Jupiter
Horsepower	80	450	450x2	500x4	500x12
Span (m.)	9.8	17.5	22.5	28.6	46
Aspect ratio	6.4	5.8	5.32	5.7	4.5
Length (m.)	7.477	12.855	17.575	24.600	40.050
Aircrew clear. above w.l.	0.72	1.40	1.81	2.24	6.45
Wing area (m <sup>2</sup> )	15.5	52.9	95.2	143.8	467.7
Wileron area (m <sup>2</sup> )	1.028	3.160	7.37	10.32	26.5
Fin. area (m <sup>2</sup> )	.265	.785	2.38	4.20	10.8
Rudder area (m <sup>2</sup> )	.398	1.200	2.12	3.61	8.32
Stabilizer area (m <sup>2</sup> )	.881	3.500	8.40	13.06	44.36
Elevator area (m <sup>2</sup> )	.932	2.385	4.18	6.85	12.72
Gross flying wt. (kg.)	670	2,860	6,030	14,100	51,500
Weight, empty (kg.)	510	1,738	3,389	7,369	24,942
Weight of crew (kg.)	80	160	240	320	720
Disposable load (kg.)	80	962	2,401	6,411	25,838
Maximum speed (km.)	137	162	191	220	240
Cruising speed (km.)	110	140	160	170	185
Landing (est.) (km.)	80	89	97	121	129
Range (km.)	587	1,610	2,280	2,910	4,240
Fuel (liters)	50	830	1,570	3,860	16,000
Design load factor	5.5	4.8	4.5	4.3	4.0
Wing loading (kg. per m <sup>2</sup> )	43.2	54.0	63.3	98.0	110

## Structural Weights (kg.)

Wings	108.2	535.1	767.5	1,898.9	7,475.8
Tail group	11.4	68.6	142.7	226.5	728.7
Controls	28.9	49.0	70.0	182.5	322.5
Hull	106.7	416	1,006.6	2,023.3	7,235.3
Nacelles	17.5	46.5	205	329.6	1,072.7
Finish	10	40	80	140	350

## Power Plant Weights (kg.)

Engine	148	335	670	1,577	4,721
Exhaust pipes	1.9	3.5	6.5	13.0	39.0
Prop and hub	13.1	36	100	239.6	720
Eng. control	1.0	6.5	17.5	65.2	350

(Continued in next column)

## Power Plant Weights (kg.) (Continued)

Type	A	B	C	D	E
Fuel system	16.9	69.8	131.6	320.4	919
Oil system	8.2	30.3	49.9	95.6	274.5
Oil and fuel in pipes	5.0	10.0	20.0	40.0	120.0

## Fixed Equipment Weights (kg.)

Engine instruments	5.4	12.2	16.0	41.0	130.0
Flying instruments	3.5	5.6	5.7	6.5	6.9
Navigation instruments	1.6	1.6	1.6	7.6	1.6
Generator equipment	1.0	3.6	6.9	8.3	30.4
Engine tools	5.2	29.3	32.5	45.8	194.8
Sea equipment	16.9	40.7	59.2	113.9	250.0

## Table 2—Data on the Hulls

Type	A	B	C	D	E
Hull Weights (kg.)					

Frames	26.46	97.91	264.64	621.73	2,298.6
Longitudinal	.....	.....	.....	89.43	731.5
Skin	53.55	194.0	538.0	831.17	2,829.7
Miscellaneous	.90	11.40	23.57	43.37	52.5
Total weight	80.91	303.31	826.21	1,585.70	5,912.3

## Sponson Weights (kg.)

Frames	5.0	34.6	85.2	131.55	665.5
Longitudinal	.....	.....	.....	.....	157.5
Skin	20.16	74.22	90.0	242.36	482
Miscellaneous	.64	3.68	5.2	7.74	18
Total weight	25.8	112.50	180.4	381.65	1,323

## Hull

Volume (m <sup>3</sup> )	3.16	13.3	32.7	92.0	351.5
Surface (m <sup>2</sup> )	16.55	48.3	87.8	174.4	442.9
Main frame area (m <sup>2</sup> )	.79	2.11	3.83	7.15	17.22

## Sponson

Volume (m <sup>3</sup> )	.42	2.7	5.8	9.5	43.5
Surface (m <sup>2</sup> )	5.02	16.0	28.4	37.0	95.0
Main frame area (m <sup>2</sup> )	.58	1.65	2.0	2.82	7.38

(Continued from preceding page)

in having more than two wing spars. The possibilities of finer and lighter wing construction are exploited in this type and entirely new lines are followed. The most notable feature is that the wing covering is no longer permanently attached to the spars and ribs, but consists of large stiff self-contained plates which are attached to the wing frames in an easily detachable manner. Figure 2 shows the relation between the total horsepower, in this flying boat family, and the weight empty.

In the graph, Figure 3, the abscissae are the areas of the wings and the ordinates are the disposable loads. A family of curves is given corresponding to ranges increasing by steps of 500 kilometers.

Type	Range	Disposable load
A....	1000 kilometers....	0
B....	1000 kilometers....	332 kilograms
C....	1000 kilometers....	1,351 kilograms
D....	1000 kilometers....	2,411 kilograms
E....	1000 kilometers....	19,738 kilograms

In passing from type B to type E the area increases nine times, (from 52 square meters to 465 square meters) and the disposable load increases sixty times, (from 332 kilograms to 19,738 kilograms.) With increase of surface from 97 square meters to 465 square meters or about 4.8 times there is an increase of disposable load for a range of 2000 kilometers (from 218 kilograms to 13,378 kilograms) or about 61 times.

Weights such as cabins, wireless, and special equipment are not included in "weight empty," but in practice the disposable load is reduced by the weight of such installations. In Figure 3 the weight of special equipment for commercial transport is shown graphically in a dotted curve. The disposable load is to be reduced by this amount. It is seen from the diagram that

the larger the size the smaller is the relative weight of the special equipment. In boats C, D, E, the ratio special equipment over disposable load has the values of .296, .214 and .111 respectively. It is therefore possible to increase the weight of the cabins for comfort and of the navigational equipment for greater safety as the size increases. Besides the question of carrying capacity, speed and radius of action, it is of special importance to form some view of the seaworthiness of each boat. Seaworthiness is not a simple thing to define and it is not at all clear what qualities are desirable. For the present (and, it should seem, for a long time to come) most experts would think it rash to lay down precise requirements. It is difficult to meet the one-sided demands of seafarers for continuously increasing seaworthiness in view of the weight empty imposed by economic considerations, yet increase of size opens a perspective of removing more or less completely the causes which very often lead to damage in a sea. This refers specially to the frequent damage to running airscrews by waves. For the five types under consideration the height of the airscrew disc above the water-line is .72 meter, 1.4 meters, 1.81 meters, 2.24 meters, 6.45 meters for types A, B, C, D and E respectively.

With an increase in the height of the carburetor from 2.5 meters above the water-line in the B type to 3 meters in C and 7.8 meters in E, the reduced risk of water filling the carburetor and thus putting the engine out of action, is evident; pilots and mechanics are increasingly safer from the sea washing over their positions. At the same time, comfort, endurance and ability to carry out repairs in rough weather are all increased. Seaworthiness and reliability in operation are actually increased by carrying an increased personnel, and our examples show that the possible increase of personnel goes up with the size of the boat.

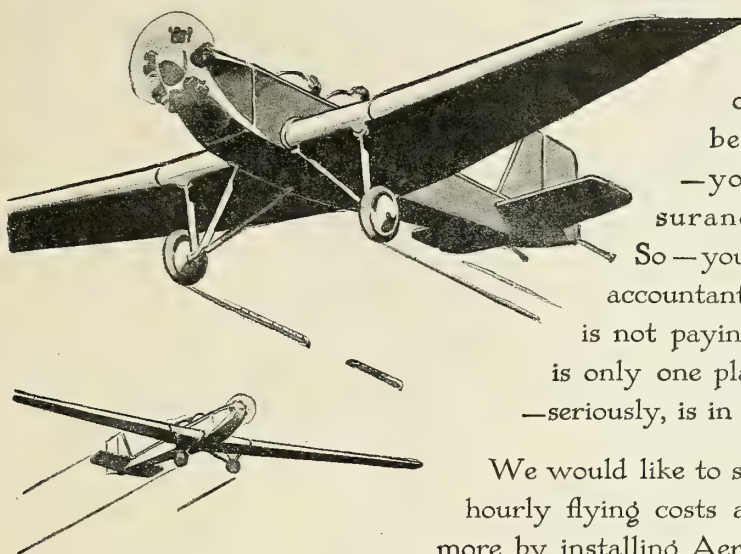
## NEW PARACHUTE FABRIC DEVELOPED

THE Bureau of Standards, coöperating with the Bureau of Aeronautics of the Navy Department, has developed a two-ply cotton yarn to be a substitute for parachute silk, it was announced recently by the Navy Department. The Bureau of Aeronautics requested the Bureau of Standards to co-operate in the development of a suitable substitute of domestic origin that would compare favorably with silk. Cotton, being the most abundant and cheapest domestic fabric available, was selected as a basis. The result was the development of a two-ply cotton yarn from which fabrics have been woven in sufficient quantities to manufacture standard size parachutes.

The yarns are subject, either before or after weaving, to a specially developed chemical treatment which tends to impart to the fabrics, additional strength and some of the desirable properties of silk. Although the weight of this fabric is slightly greater than that of silk fabrics, its breaking strength, resistance to tear, elongation, and air permeability compare favorably. Several objectionable features of silk, such as the deteriorating effect of sunlight and atmosphere, and the care required in handling, have been reduced or eliminated. It is expected that the cost of the fabric will be reduced.

This material, untreated, treated before weaving, and treated after weaving, together with cotton balloon cloth and several cotton fabrics developed by domestic manufacturers, will be manufactured into parachutes of standard size and construction at the Naval Aircraft Factory. The completed parachutes are to be tested in comparison with silk Navy parachutes by dropping them, loaded with a 180 pound dummy, from an airplane traveling 100 miles per hour at an altitude of 1,000 feet.

# ARE YOU UP IN THE AIR ABOUT COSTS?



**Y**OUR instruction charges are based on so many hours of student flight. Each hour must bear its ratio of fixed charges—your rent, taxes, payroll, insurance, and many other items. So—you don't need a certified public accountant to tell you that if your school is not paying the profit it should—there is only one place for the leak—and that—seriously, is in the air.

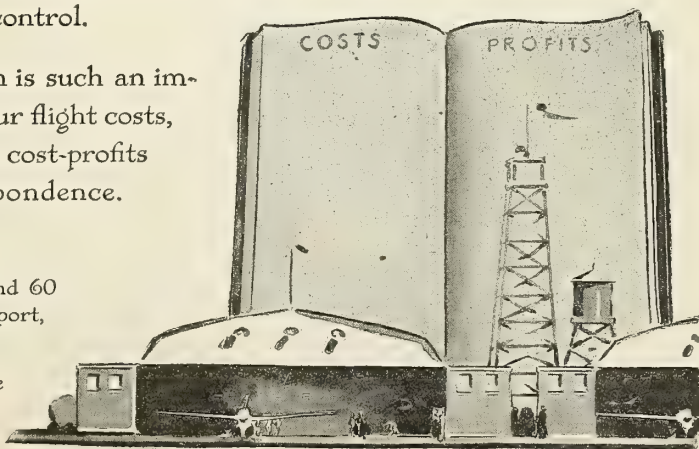
We would like to show you how average hourly flying costs are reduced 30% or more by installing Aeromarine planes as standard equipment. Their economy extends to operation, minimum of maintenance, ground handling and hangar space.

The AKL-25 is the ideal light plane for training and for sport. Powered by the famous, dependable Salmson 40 horsepower, nine-cylinder radial,—or by the equally well known, sturdy LeBlond 60 horsepower, five-cylinder, radial engine (\*)  
... these planes are built to stand rough handling and to win friends for your school by their ease of control.

Since economy of operation is such an important factor in reducing your flight costs, we would like to take up your cost-profits problem with you by correspondence. Write us today.

(\*) The AKL-60, powered by the LeBlond 60 h. p. engine, sells for \$3500, flyaway, Keyport, N.J.

Equipped with pontoons and powered by the LeBlond engine, the AKL-60 sells for \$4500, flyaway, Keyport, N.J.



## AEROMARINE KLEMM CORPORATION

PARAMOUNT BLDG. • 44th STREET AND BROADWAY • NEW YORK CITY



# LT. WILLIAMS' "MERCURY" RACER

**D**ETERMINED not to enter his specially built Mercury racing monoplane in the Schneider Cup races in England until flight-tested to his satisfaction, Lieut. Al Williams, Navy speed king, was awaiting favorable weather at Annapolis, Md., for the first air trials as *AERO DIGEST* went to press.

Nation-wide interest has been aroused in the possibility of the United States being represented in the annual racing classic, held this year at Calshot, near Southampton, England. The secrecy surrounding the building of the craft at the Naval Aircraft Factory, Philadelphia, was maintained even after the monoplane was launched on the Delaware River, no details being given out and no photographers being allowed near the scene.

Private capital, including most of Lieut. Williams' personal funds, was involved in the undertaking. A non-profit organization known as the Mercury Flying Corporation, Mr. Seth Low, president, was formed among a group of patriotic sportsmen who

are interested in recovering the coveted speed record for the United States, and the assistance and cooperation of the Naval Aircraft Factory were enlisted to provide facilities for the immense amount of research necessitated by the project. Lieut. Williams was the moving spirit in the formation of the Mercury Flying Corporation, and the plane was built under his direction and tested personally by him after its launching.

The present Mercury racer follows closely the major points in the design of the 1927 model of the same name, which developed a high speed of 290 miles per hour. The most important change in design is the use of monoplane, instead of the earlier biplane construction. The same engine, the Packard "X," developing 1,100 horsepower will be used, in connection with a geared-down propeller. The gearing of the propeller and the location of all four carburetors and their accompanying intake manifolds in the vertical vees between the banks of cylinders constitute the principal changes in the de-

sign of the engine. It is said these improvements result in a much better streamlined effect and consequent higher speed and engine performance. The gearing of the propeller, in addition, eliminates the reverse propeller torque which was present in other geared engines of American racing planes.

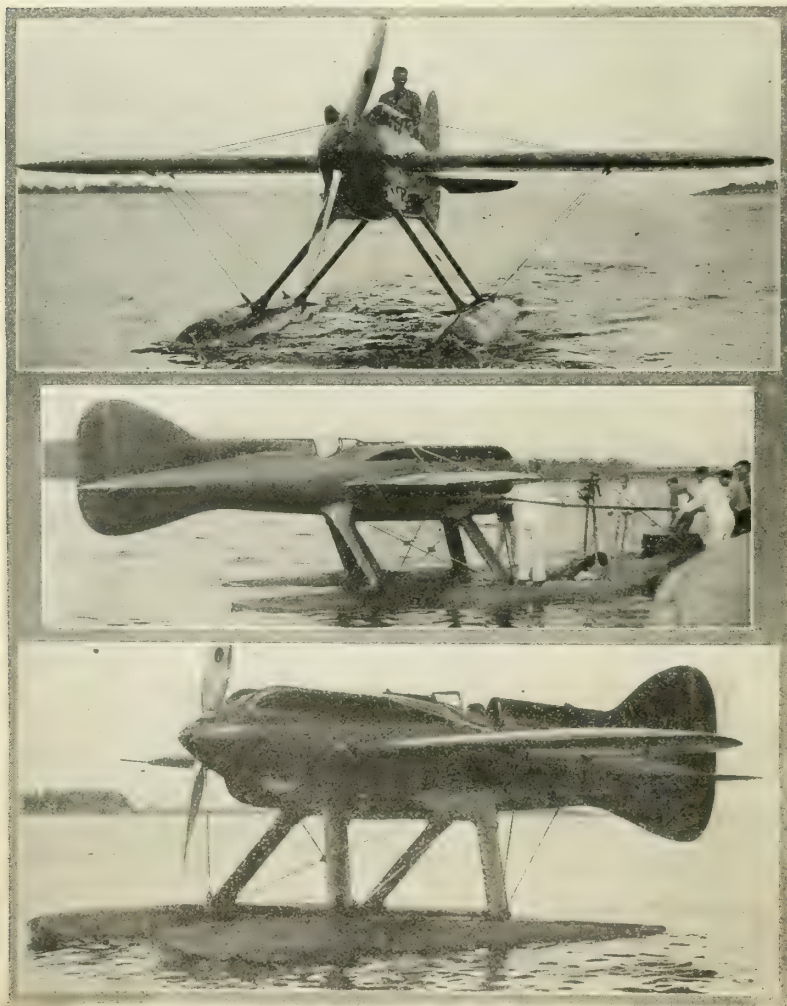
The construction of the seaplane itself is quite similar to the 1927 model. Fuselage, wings and fixed tail surfaces are of wood; the control surfaces and floats are of metal. All bracing except the float struts are steel tie rods, carefully streamlined to cut down resistance.

A new engine cooling system is adopted in the present racer. Radiators are located in both the wings and floats, which protects the engine against overheating caused by extensive taxiing on the water, the most dangerous period in the operation of racing seaplanes of this type. When the powerful engine is opened wide on the water before taking off, the air stream over the wing surfaces is not sufficient, usually, to carry away the heat thus generated, resulting in a badly overheated engine. Water in the float radiators is cooled by contact of the float with the water over which the plane is taxiing, which fully compensates for the lack of efficiency of the wing radiators at low speeds. With the plane in the air, the wing radiators, which on the Mercury seaplane are so constructed as not to interfere with the aerodynamical qualities of the wing, are sufficient to provide adequate cooling by means of the air passing over their surfaces. Thus the present model is assured of satisfactory operating temperature under all flight conditions.

The development of the design of the racing seaplane took place in the Bureau of Aeronautics of the Navy Department. The Navy, with the future performance of high-speed fighting seaplanes in view, obviously had an intense interest in the success of the venture, and offered every cooperation and assistance. Models were tested in the wind tunnel at the Washington Navy Yard, under the supervision of Lieut. Williams. The Navy further cooperated by providing the transportation of the craft from the Naval Aircraft Factory, at Philadelphia, to Annapolis for flight tests, because of the lack of space on the Delaware River opposite the factory, where shipping and river traffic, combined with driftwood and all kinds of floating objects, constituted a menace to the success of the tests.

Commander Ralph D. Weyerbacher, manager of the Naval Aircraft Factory at Philadelphia, offered the engineering facilities there in developing the detail designs for the craft's construction. After approval by Lieut. Williams, the actual construction began at Philadelphia, under the supervision of Mr. John S. Kean, aeronautical engineer, who created the idea of float radiators and was responsible for other new and novel features of the new seaplane's construction.

(Continued on next page)



Lieut. Williams' racing monoplane being tested at Annapolis, Maryland



*In the engineering rooms at the new B/J Plant, Baltimore Airport*

## The B/J Franchise is Valuable

**M**AN power is the secret of salespower for the B/J distributor and dealer. Back of the B/J plane is the weight of a great staff of foremost aircraft engineers. They were gathered together for the pioneering of new designs for military planes. This same original designing is carried into the B/J commercial planes, truly destined to be pacemakers of the air. Every B/J distributor and dealer knows that back of the plane he sells is an engineering staff that is making history for the planes they build, and permanent profits for the dealer. Some distributor territories are open.

### BERLINER-JOYCE

AIRCRAFT

BALTIMORE



CORPORATION

MARYLAND



(Continued from preceding page)

The Navy Department and the Mercury Flying Corporation received the enthusiastic support of numerous commercial interests of the aeronautical industry in the construction of the plane. Prominent among those who offered assistance in the project are such firms as the B. & G. Spark Plug Co.; the Macwhyte Co., manufacturers of streamlined tie rods; the Texaco Co., donors of special fuel and lubricants; the Electric Storage Battery for ignition and storage batteries; the Aluminum Company of America, Stromberg Carburetor Co., Scintilla Magneto Co. and others.

The design of the plane has been shown to be technically and aerodynamically correct, and the construction is undoubtedly adequate, but there remains the question of the proper functioning of the 24-cylinder X-type Packard engine. Until this question has been solved to the satisfaction of Lieut. Williams and others concerned, no attempts at any record or participation in the race will be considered.

On a recent motor-checking expedition, the craft was taxied along the Severn River at a speed of slightly more than 100 miles per hour. A course has been selected off Kent Island, in Chesapeake Bay, for the first flight tests, which has been pronounced by Lieut. Williams to be admirably suited to the needs of the small plane. The minimum of rough air in the vicinity has been attributed to the low, sandy beach which covers one shore of the island. The water is unusually smooth there, it is said, naval speedboats having been frequently tested in the region.

Opinions differ as to the probability of the Mercury's attaining the high speed of 400 miles per hour which its backers claim. Lieut. Williams has announced that he will not enter the seaplane in the Schneider Trophy event unless he can better the mark of 318 miles per hour, made by Major Di-Bernardi, of Italy, in 1928.

The characteristics and performance of the racer are as follows:

Type .....Twin-float monoplane seaplane  
Engine .....Packard "X," 24-cylinder  
Rated power .....1,100 horsepower  
Wing section .....NACA M-6  
Weight empty...Approximately 4,400 pounds  
Wing loading:

In excess of 30 lbs. per sq. ft.

Power loading .....4 pounds per h.p.  
Fuel capacity .....90 gallons  
Oil capacity .....9 gallons  
High speed:

In excess of 300 miles per hour

Stalling speed .....100 miles per hour

## PLYWOOD STRUT

PLYWOOD "I" struts of large dimensions are used by the E. M. Laird Airplane Company in the manufacture of the latest Laird model. The struts are made of 9-ply Haskelite plywood in a set-back construction which streamlines the strut. Only two of the struts are needed for a plane and these are placed on the wings well toward the tip.

The individual plywood layers of the



Plywood strut used on Laird plane

struts are glued together permanently by a special, water-resistant blood albumen glue, developed by the Haskelite Manufacturing Corporation. The struts are said to retain their efficiency for some time without requiring any maintenance other than a touching up now and then with lacquer or varnish. The "I" struts give the new Laird a neat, trim appearance.

## MORELAND MONOPLANE

A PARASOL monoplane of interesting design was recently put in production by Moreland Aircraft, Inc., of Inglewood, California. This plane, which is a three-place open landplane, is powered by a Wright J-5 Whirlwind engine, delivering 225 horsepower at 1,800 revolutions per minute. Clean in general appearance, this ship incorporates many of the latest features of construction.

The wings are of the semi-cantilever type, braced by two parallel struts which are attached to the wing at a point about one-fourth the distance from the center section to the wing tip. Additional rigidity is furnished by a diagonal strut extending from the top of the rear strut to the point where the front strut joins the shock absorber strut of the landing gear. The wing is built up of spruce box spars and spruce ribs. The covering is plywood.



The Moreland M-1, a 3-place open cockpit parasol monoplane

The construction of the fuselage is conventional welded chrome-molybdenum steel tubing, fabric covered. At intervals along the fuselage there are zipper type inspection openings to allow easy access to the tail surface control mechanism. The rudder is balanced and stabilizers are adjustable. The stabilizer is hinged at the rear, placing the range of adjustment at the leading edge. The tail surfaces are braced externally by streamline wires. Elevator horns are on the under side.

The landing gear is of the split axle type, with Aerol shock absorber struts. Both wheels are equipped with Bendix brakes.

The cockpits, front and rear, are upholstered in Spanish leather. A large door facilitates entrance and exit to the front cockpit. The windshield of the front cockpit extends vertically from the wing to the cowl and longitudinally from the front cockpit to the point where the door hinges.

Standard equipment includes: oil pressure gauge, oil temperature gauge, gasoline gauge, primer, gas shut-off and drain, bank and turn indicator, altimeter, tachometer, rate of climb indicator, compass and air speed indicator.

### Specifications

Span .....	39 feet
Length overall .....	26 feet, 6 inches
Height overall .....	8 feet, 9 inches
Chord .....	7 feet
Wing area (including ailerons) ..	260 sq. feet
Aileron area .....	23 square feet
Rudder area .....	9 square feet
Fin area .....	5 square feet
Stabilizer area .....	20 square feet
Elevator area .....	16 square feet
Weight empty .....	1,750 pounds
Useful load .....	1,000 pounds
Gross weight loaded .....	2,750 pounds
Wing loading .....	10 pounds per square foot
Power loading .....	12 pounds per horsepower
Fuel capacity .....	70 gallons
Oil capacity .....	7 gallons

### Performance

High speed .....	132 miles per hour
Landing speed .....	40 miles per hour
Cruising speed .....	115 miles per hour
Climb (from sea level) ..	1,000 feet per minute
Service ceiling .....	17,800 feet
Absolute ceiling .....	20,000 feet
Cruising range .....	650 miles

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**B**RAKES on the main wheels of airplanes have contributed to the increased use of the tail wheel, and although at the present time brakes are more or less optional equipment to the purchaser, or are sold on the basis of the safety their use affords, the time may not be far distant when brakes will be installed as a matter of regulation or law because they are a protection to the people or property on crowded airports.

The use of brakes makes the tail wheel practical, and even though no particular public hazard might necessitate its use, the maintenance of our great airports will. On turf or runway the rolling wheel is a decided improvement over the ploughing skid. In future years, airport authorities may take a hand in the protection of their property by requesting the use of tail wheels which do not tear up the field or runways.

But if we study the problem more carefully, we find that destructiveness of the skid is least important in popularizing the tail wheel.

Why a tail wheel, when it is heavier and more costly than a skid?

In some respects the tail skid has been a bad actor.

Noisy, damaging to fuselage structure and airport, wearing and grinding off shoes (especially on our new hard-surfaced runways), requiring a ground crew and special equipment to park each ship, excessive wear on bearings and attaching fittings, the skid has many features which fail to recommend it. In cabin planes noise is amplified by the megaphone shape of the fuselage.

When we replace the skid by a device that largely eliminates noise and excessive wear, contributing to the comfort of the passengers and reducing the cost of maintenance, we have provided something every purchaser has reason to expect in a modern airplane.

The tail wheel correctly installed adequately compensates for its additional weight by making possible quiet take-offs and landings, reduced wear on equipment, easier taxiing and parking and reduced maintenance costs.

It is in line with the current trend, therefore, to presume that tail wheel installations on future airplanes will be seriously considered and we may expect their universal adoption.

The position of the tail wheel unit is so far aft that differences in weight influence the center of gravity. Wide distribution of weight also has its influence on inertia and relative maneuverability. Reduction of the resistance in the air is a further consideration.

In order to minimize weight and resistance, a tail wheel should be as small as practical. The smallest pneumatic wheel for this purpose (10 by 3 tires) approaches the minimum size possible to manufacture because of the small hole left for removal of the mold equipment.

A ten-inch diameter wheel landing or taking off at from 40 to 50 miles per hour rotates from 1,300 to 1,700 revolutions per minute; a 14-inch tire from 1,000 to 1,200 revolutions per minute; a 16-inch tire from

# THE TAIL WHEEL

By D. Earle Dunlap

*Vice Pres. and Chief Engineer, Johnson Airplane & Supply Co.*

700 to 900 revolutions per minute and a 20-inch tire from 800 to 1,100 revolutions per minute.

Although these high speeds of rotation are but momentary, when they are combined with the radial and side loads present, they lead to bearing difficulties. Perhaps the best compromise between light weight and small size would fix the 10-inch wheel as the smallest size for light airplanes. Larger wheels must be fitted as the imposed weight is increased on larger ships.

The combination of high speeds of rotation, presence of dirt or water, weight and shock imposed, both radial and side loads, makes the bearings important factors. Plain bearings are at a decided disadvantage here. Although they are light, they will not stand up under severe conditions, a fact to which repeated experiments attest. Ball bearings that absorb combined radial and side load are improvements, but shock on the point contact of a few balls may damage the races. Plain roller bearings mean greater contact, but do not provide for side load, and the tail wheel at the end of its lever arm must encounter considerable side loads if its rotation is restrained in any way.

The Timken type of bearing is especially suitable for the purpose. Radial load and shock is widely distributed and all of the rollers act in side load. Well lubricated and properly protected from dirt and grit, this type of bearing has advantages that again contribute to a compromise between light weight and adequate strength. Smaller bearings mean smaller hubs and axles—reducing the weight. The Timken bearing is also adjustable—with these bearings the wheel is always firmly seated regardless of wear. Any type of bearing must be well lubricated.

Which is the best type of tail wheel remains

undetermined. Our organization has experimented with wooden wheels, disc wheels, composition wheels with impregnated bearings, solid rubber tires on disc wheels and solid rubber wheels into which the hub metal is vulcanized.

With the wooden, composition and solid rubber tire types, we not only had bearing difficulties, but found these types were not nearly as quiet in their operation as those using pneumatic tires. Built up disc wheels meant loose parts and other difficulties. Our solid rubber tires "rolled off" in side load on service tests. In the solid rubber wheel the metal hub soon loosened up and burnt out; in one instance, the wheel broke in side load. Wire wheels in the smaller sizes presented manufacturing and assembly difficulties which are not encountered with specially designed disc wheels.

We have found in our own tests that the quiet and smooth performance of the pneumatic tire on a disc wheel is apparently the most satisfactory, and consequently I shall confine further discussion to this type.

The tires available are straight side in all of the sizes and are as carefully constructed as in the main wheels. Nearly all have four ply carcasses, and either smooth or non-skid tread. On the matter of tread design, the designer's opinion or experience must guide his selection. In some types of rough treads, the tire may pick up excessive mud or dirt, but the smooth tread does not mean freedom from this difficulty. Perhaps the greater thickness of the rough tread means longer life.

There is a variety of existing methods for installing a tail wheel. Various shock absorbers used in tail skid arrangements may also be utilized with a wheel, tension rubber, compression rubber, oleo strut, air or steel springs.

Mounting the wheel so that it affords no lateral motion does not permit easy taxiing or parking, and the considerable side loads must be taken by the wheel and its supporting structure.

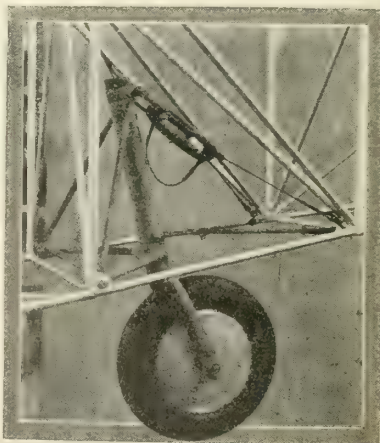
The greatest utility for parking can be obtained by mounting the wheel as a castor; i. e., with its ground contact behind the center line of lateral rotation, and free to turn through 360 degrees. This movement is not the best for taxiing when only about 180 degrees is required, since the unrestrained wheel dances from side to side over rough ground.

Compromising again, a wheel may either have a gadget to change it on the ground from restricted movement of 180 degrees to free swivel through 360 degrees, or the movement may be restricted to 180 degrees with a removable auxiliary yoke handle to facilitate its steering on the ground for parking. This handle must permit both pushing and pulling on the part of the operator.

It is well to restrict the lateral rotation of the tail wheel unit by springs on shock absorber rubbers to the fuselage structure, or through springs to the rudder pedals.

Another important point to bear in mind is the center line of lateral rotation itself. This center should be vertical to the ground when the wheel is on the ground. When

(Continued on next page)



Tail wheel and its mounting in the body

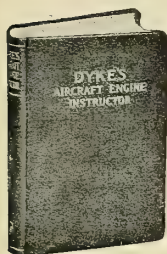
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By Capt. R. Duncan

Licensed Pilot in U. S., Canada, France, England

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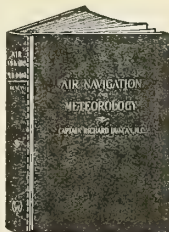
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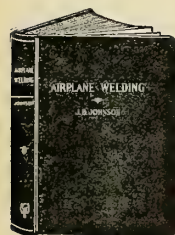
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There is nothing academic or with the school-room flavor in the material he gives you. He talks right from the shoulder in the language of the shops. His book is easy to read and easy to understand. You get every point he brings out, not only easily and quickly, but in a way so you will never forget it.

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(Continued from preceding page)

this center is not vertical to the ground, the weight on the wheel tends to keep the wheel in longitudinal alignment, as if the motion were restrained.

If the center line is reversed, however,—and it is quite easy on the design board to make the mistake of fixing this lateral rotation perpendicular to the upper longeron or flight position,—the wheel is difficult to steer while on the ground.

Forks should be of generous dimensions and clearances, to prevent articles picked up by the tire from jamming between the wheel and fork. Bearing bolts should also be of generous size as a guard against wear; they should be well lubricated; and if possible, mud guards should be used.

The above resumé of current practice and previous difficulties in the matter of tail wheel units should be of value to the designer.

The tables of load-deflection, weight, strength, etc., of these small wheels will also serve as a guide in fixing the proper size of wheel for any particular installation. It is quite possible on heavier planes that two or more of these wheels may be used in combination.

Tire Size	Ply	Weight in Pounds				Maximum Loading*
		Tire	Tube	Wheel	Total	Inflated
10 by 3.....	4	1.9	.50	1.88	4.38	375
14 by 3.....	4	3.2	.65	6.15	10.00	400
16 by 4.....	4	5.5	.75	6.15	12.40	750
18 by 3 smooth	3	3.8	.75	8.62	13.17	375
20 by 4.....	4	7.2	1.13	8.62	16.95	775

\* Inflation pressure of 50 pounds per square inch.

## STEARMAN LIGHT TRANSPORT

A LIGHT transport biplane for mail and passenger service is the latest addition to the line of ships produced by the Stearman Aircraft Company of Wichita, Kansas. Powered with a Pratt and Whitney Hornet engine, this plane accommodates four passengers in the cabin, a pilot in an open cockpit aft of the cabin, and 500 pounds of mail. The mail compartment is located immediately in front of the passenger cabin. All controls are mounted on ball bearings so that their operation is

remarkably free and easy. In the development of the Stearman Speed Mail and the Stearman Light Transport it was found that quality aluminum castings were very much to be desired. In order that quality be maintained and assured the Stearman company has built a complete foundry for the casting of aluminum parts. All aluminum castings of Stearman products are made in that foundry and tested in the company's laboratories.

The pilot's cockpit is roomy and is supplied with every convenience for the pilot's comfort and safety. The seat is adjustable in the fore and aft, as well as vertical, direction. The instrument panel is indirectly lighted, and all navigation instruments are set so that, at 3,000 feet altitude and normal cruising speed, the hands point horizontal and inward toward the compass and turn and bank indicator. The motor is shielded and the ship bonded for the installation of radio. All wiring is in conduit and terminates in a junction box that is conveniently located to the pilot's right hand where switches are placed so as to be convenient for him at all times and under all operating conditions.

A maintenance feature that is attractive to the operator is provided in the fuselage covering. The fuselage is metal covered to a line immediately in rear of the pilot's cockpit. These sheets of metal are easily removed, exposing all control surfaces, and all control and fuel and electric lines. Passengers are provided with comfortable deep seated cushions carefully placed and designed to overcome the fatigue attendant upon sitting in one position for an extended length of time. The cabin is provided with an altimeter, air speed indicator, clock and a map case for the map covering the route over which the ship is flown.

The landing gear is of the split axle type equipped with shock-absorber struts. A tail wheel is used instead of a skid. The wings are braced externally by interplane N struts. Navigation lights are provided, and under the lower wing are streamlined landing lights. The rudder is of the balance type. The exhaust stacks from the engine extend under the fuselage to a point beyond the passenger cabin.

### Specifications

Span upper wing.....49 feet  
Span lower wing.....34 feet 6 inches

Chord upper wing.....88 inches  
Chord lower wing.....57 inches  
Area upper wing.....347 square feet  
Area lower wing.....143 square feet  
Angle of incidence (upper wing).....None  
Angle of incidence (lower wing).....None  
Dihedral (upper wing).....2 degrees  
Dihedral (lower wing).....2 degrees  
Overall length.....32 feet 9 inches  
Power loading.....12.4 lbs. per h.p.  
Wing loading.....13.2 lbs. per sq. ft.  
Weight empty.....3,932 pounds  
Gross weight loaded.....6,500 pounds  
Pay load.....1,500 pounds  
Fuel.....146 gallons  
Landing speed.....50 miles per hour  
Cruising speed.....115 miles per hour  
High speed.....140 miles per hour  
Service ceiling.....18,000 feet  
Climb.....900 feet per minute  
Normal range.....770 miles

## LEAFLET ISSUED ON MICARTA PRODUCTS MICARTA LEAFLET

A DIRECT mail folder, 5171, on Micarta Airplane tailwheels, fairleads, hinge bearings, and cabin-lining plate has recently been released by the Westinghouse Electric and Manufacturing Company. Micarta tailwheels recently put on the market are light and strong. They are fitted with self-lubricating bearings and are well suited to withstand severe service.

Micarta hinge bearings, of which a complete line are now offered, are used for elevator, rudder and aileron bearings. They are lighter than ordinary metal hinges and very strong mechanically.

## INVINCIBLE MONO- PLANE REVISED SPECIFICATION

THE aircraft division of the Invincible Metal Furniture Company of Manitowoc, Wisc., has announced revised specifications for the 4-place Invincible cabin monoplane. This plane, which is now powered with a Curtiss Challenger engine delivering 170 horsepower at 1,850 revolutions per minute, was described in the July issue of AERO DIGEST. The new specifications and performance data are listed below:

Span.....40 feet  
Length overall.....25 feet 7 inches  
Height overall.....7 feet 3 inches  
Total wing area.....228 square feet  
Aileron area.....22.6 square feet  
Rudder area.....8.1 square feet  
Fin area.....5 square feet  
Stabilizer area.....12.2 square feet  
Elevator area.....13.4 square feet  
Weight empty.....1,740 pounds  
Useful load.....1,164 pounds  
Pay load.....610 pounds  
Gross weight loaded.....2,904 pounds  
Fuel capacity.....60 gallons  
Oil capacity.....5 gallons  
High speed.....142 miles per hour  
Cruising Speed.....120 miles per hour  
Landing speed.....45 miles per hour  
Climb.....1,000 feet per minute  
Cruising range.....700 miles



Four passengers and 400 pounds of mail are carried in the Stearman Light Transport



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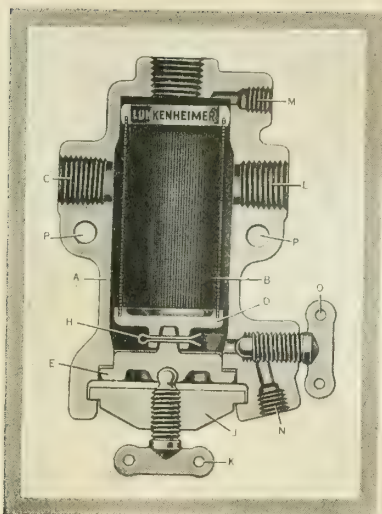
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### LUNKENHEIMER GASOLINE STRAINER

THE Lunkenheimer Company, of Cincinnati, Ohio, recently introduced for aircraft service an aluminum gasoline strainer which incorporates several new features. The device consists of two units—(see illustrations) body, part A, and strainer assembly, parts B to K. The strainer assembly may be removed with one hand by a half turn of the thumb screw (K). All parts of strainer assembly are securely fastened together to avoid danger of any part becoming detached and lost.

Two gasoline inlet connections (L) are provided. The double inlet connections eliminate numerous fittings in the gasoline system on planes having two-wing gasoline tanks. Where only a single gasoline connection is desired, it may be made to either side of the strainer; and the other connection may be plugged. The inlet and outlet connections are designated by cast inscriptions "inlet" and "outlet."

The connection (M), near top of body, is provided to supply gasoline to the primer. This connection is a tapped  $\frac{1}{8}$  inch pipe thread.

The drain connection (N) is a part of the body, rather than a part of the cap as in some other constructions. The drain of the strainer may be piped to the outside of the fuselage and does not interfere with the removal of the strainer assembly. The drain connection is tapped  $\frac{1}{8}$ -inch pipe thread.

The strainer is interchangeable in mounting with the Air Corps C-1 strainer, the distance from center to center of supporting lugs and the diameter of bolt holes being the same. The supporting lugs on the Lunkenheimer strainer project beyond the back of the body sufficiently to bear against the fire wall or other support to which strainer may be attached. When tightening the bolts, the contact is directly between the support and lugs and not between the body and support, which latter contact would have a tendency to bulge the fire wall.

The strainer is light in weight, since nearly all parts are made of aluminum. The strainer gauze is fine mesh Monel.

## RECENT AERONAUTICAL PATENTS

THE following patents of interest to readers of AERO DIGEST were recently issued from the United States Patent Office. Copies thereof may be obtained from R. E. Burnham, patent and trade-mark attorney, Continental Trust Building, Washington, D. C., at the rate of 20c each. State number of patent and name of inventor when ordering.

Undercarriage for airplanes. William E. Gray, London, England. (No. 1,716,439.)

Airship. August Mueller, Pittsburgh, Pa. (No. 1,716,597.)

Braking device for airplanes. Andrew Kolody, Chicago, Ill. (No. 1,716,644.)

Device for launching and landing airplanes from and upon suspended positions. Lawrence B. Sperry, Farmingdale, N. Y.; assignor to Lawrence Sperry Aircraft Co., Farmingdale, N. Y. (No. 1,716,670.)

Flying-machine. Hallett O. Norman, Couch, Oregon. (No. 1,716,734.)

Folding undercarriage for aircraft. Thomas Reilly, Fonda, Iowa. (No. 1,716,736.)

Method and apparatus for forming letters and symbols in the air. John T. Remey, New York, N. Y. (No. 1,716,794.)

Method of producing colored smoke clouds. John C. Savage, New York, N. Y. (No. 1,716,797.)

Aeroplane. Stanley Wiechacz, Detroit, Mich. (No. 1,716,995.)

Aeroplane flying-torpedo carrier. Charles Kesses, New York, N. Y. (No. 1,717,159.)

Aircraft. Andrew J. Kucher, Chester, Pa. (No. 1,717,390.)

Cushioned car for aircraft. Willis C. Ward, Orchard Lake, Mich. (No. 1,717,533.)

Airship. Alpin L. Dunn, New York, N. Y. (No. 1,717,552.)

Landing-platform for airplanes. Jesse W. Reno, New York, N. Y. (No. 1,718,006.)

Braking mechanism for aerial machines. Edward B. Boughton, London, England. (No. 1,718,108.)

Heavier-than-air airship. George C. Brown, Dallas, Tex. (No. 1,718,109.)

Retractable landing-gear. Milton C. Bauman, Dayton, Ohio. (No. 1,718,189.)

Airship. Claude H. Freese, Los Angeles, Cal. (No. 1,718,343.)

Flying-machine. Lewis J. Tetlow, Holyoke, Mass. (No. 1,718,391.)

Parachute carrier and release. Frank B. Fisher, Jr., Kansas City, Mo. (No. 1,718,551.)

Aircraft device. Harold F. Pitcairn, Bryn Athyn, Pa. (No. 1,718,577.)

Governing system for diesel engines with arrangements to work with increased admission pressure (supercharging). Kurt Schmidt, Cologne-Holweide, Germany. (No. 1,718,586.)

Aeroplane. Charles J. Wagner, Cousins, N. Mex. (No. 1,718,617.)

Control mechanism for aeroplanes. Hervey M. Salisbury, Walnut Grove, and Arthur E. Miller, Sacramento, Cal. (No. 1,718,707.)

Airplane. Clarence O. Prest, Arlington,

Cal. (No. 1,718,834.)

Airplane. Frank Brown, Berkeley, Cal. (No. 1,718,892.)

Aeroplane landing gear. Knut Henriksen, Garden City, N. Y.; assignor to Curtiss Aeroplane & Motor Co. (No. 1,718,956.)

Aeroplane. Charles Trevor, Jersey City, N. J. (No. 1,719,031.)

Flying-machine. Victor Ehmgig, Paris, France. (No. 1,719,048.)

Propeller arrangement for flying machines, airships, and the like. Josef A. Hallander, Stockholm, Sweden. (No. 1,719,225.)

Airfoil. Paul E. H. Gripon, Washington, D. C. (No. 1,719,293.)

Airplane. Charles J. McCarthy, Flushing, and Michael White, New York, N. Y.; assignors to Chance M. Vought, Great Neck, N. Y. (No. 1,719,797.)

Aeroplane and landing chassis therefor. Michael White, New York, N. Y.; assignor to Chance M. Vought, Great Neck, N. Y. (No. 1,719,798.)

Aircraft. Michael White, New York, N. Y.; assignor to Chance M. Vought, Great Neck, N. Y. (No. 1,719,799.)

Safety parachute device for aircraft. Charles S. Hall, Oakland, Cal.; assignor to Hall Engineering & Aircraft Construction Co. (No. 1,720,041.)

Aeroplane. Jakob Hojnowski, Nekoosa, Wis. (No. 1,720,330.)

Fireproof dirigible airship. Thomas B. Slate, Glendale, Cal. (No. 1,720,382.)

Method and means for working combustion engines at variable elevations. Felix Gruebler, Zurich, Switzerland. (No. 1,720,414.)

Airplane. Flavius E. Loudy, Cleveland, Ohio; assignor to Glenn L. Martin Co. (No. 1,720,421.)

Stabilizing device for aircraft. Philip D. Stead, Norfolk, Va. (No. 1,720,576.)

Control mechanism. Daniel J. Brimm, Jr., West Hempstead, N. Y.; assignor to Ireland Aircraft, Inc. (No. 1,720,661.)

Aeroplane construction. Melvin E. Dare, Detroit, Mich. (No. 1,720,667.)

Seaplane. Ludwig Staiger, Birkenwerder, Germany. (No. 1,720,698.)

Collapsible structure such as pontoons and seaplane floats, divisible into boats. Nicholas Straussler, Westminster, London, England. (No. 1,720,701.)

Flying-machine. Alonzo C. Mather, Chicago, Ill. (No. 1,720,846.)

Airship-truck. Karl Stahl, Friedrichshafen-on-the-Bodensee, Germany. (No. 1,720,928.)

Flying-machine. George W. Wilkin, Grangeville, Idaho. (No. 1,720,939.)

Aeroplane control. Daniel G. Lilley, Denver, Colo. (No. 1,720,960.)

Method of treating outer covers for aircraft. Karl Hurtle, Akron, Ohio; assignor to Goodyear-Zeppelin Corporation, Akron. (No. 1,721,302.)

Airplane-wing construction. Victor C. Bernhardt, Detroit, Mich. (No. 1,721,329.)

Aeroplane. Richard D. Holmes, Hamtramck, Detroit, Mich. (No. 1,721,342.)

(Continued on next page)



THE STANDARD  
SPARK PLUG OF  
THE WORLD

LINDBERGH — BYRD — CHAMBERLIN — WILKINS  
EARHART — MAITLAND — HEGENBERGER — STINSON  
HALDEMAN — MYERS — SCHLEE — BROCK

## Make this your guide in buying spark plugs

AC has developed three successful types of metric spark plugs which are especially designed and built for aircraft engines.

**AC TYPE "N":** Known as our Metric Aircraft Regular, is recommended for air cooled engines operating at cruising speeds, or where consistent fouling is experienced with type "NN-1" or pre-ignition with type "N-1."

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**AC TYPE "NN-1":** Known as our Metric Aircraft Short, is recommended for air cooled engines operating at full throttle over long distances, or where pre-ignition is experienced with type "N."

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of engine you use,  
it's a better engine  
when equipped with  
AC Spark Plugs*

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AC GASOLINE STRAINERS AC AMMETERS AC OIL GAUGES AC THERMO GAUGES

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(Continued from preceding page)

Combination aeroplane and boat. Archie E. Durham, Clarendon, Va. (No. 1,721,437).

Heavier-than-air flying machine. Harris G. Hooper, Brooklyn, N. Y. (No. 1,721,450).

Rigid airship. Erich Hilligardt, Friedrichshafen-on-the Bodensee, Germany. (No. 1,721,499).

Tail structure for aeroplanes. Julius M. Karrasch, Orange, N. J. (No. 1,721,598).

Airship. James N. Lewis, New York, N. Y. (No. 1,721,631).

Airplane. John H. Davis, Philadelphia, Pa.; assignor to Air Line Transportation Co., Philadelphia. (No. 1,721,772).

Airplane. John H. Davis, Philadelphia, Pa.; assignor to Air Line Transportation Co., Philadelphia. (No. 1,721,773).

Aircraft flight control. John B. Herget and Albert F. Walloch, Seattle, Wash. (No. 1,721,818).

Flare-releasing mechanism for aircraft. Charles N. Monteith and Louis S. Marsh, Seattle, Wash.; assignor to Boeing Airplane Co., Seattle. (No. 1,721,883).

Aeroplane. Roman B. Maliszewski, Milwaukee, Wis. (No. 1,721,916).

Aircraft. Arthur L. Thurston and Harry T. Booth, Hammondsport, N. Y. (No. 1,721,935).

Dusting apparatus. Thomas H. Huff, Ogdensburg, N. Y.; assignor to Keystone Aircraft Corporation. (No. 1,722,467).

Multivane aeroplane. John Bilan, Flint, Mich. (No. 1,722,487).

Brake means for aeroplanes. William Thomasson, Parsons, Kans. (No. 1,722,509).

Aircraft. Albert C. Wilcox, Bridgeport, Ohio. (No. 1,722,651).

Gyroplane. Lawrence E. Robbins, Ellsworth, Me. (No. 1,722,708).

Master connecting-rod for radial-cylinder engines. Edward T. Jones, Ridgewood, N. J.; assignor to Wright Aeronautical Corporation. (No. 1,723,175).

Aeroplane. Joseph F. Goodrich, Everett, Wash. (No. 1,723,479).

Aircraft control. Horace H. Lybbrand, Washington, D. C. (No. 1,723,653).

Pusher airplane. Carl G. Thompson, St. Louis, Mo. (No. 1,723,666).

Airplane. William D. Clark, Washington, D. C. (No. 1,723,678).

Course and distance indicator. Herbert Addison, Worthing, and William B. Luard, Falmouth, England. (No. 1,723,757).

Airplane. Vincent J. Burnelli, New York, N. Y. (No. 1,723,763).

Airplane. Randolph F. Hall, Ithaca, N. Y. (No. 1,723,778).

Gas bomb adapted to be discharged from aircraft. Archie F. and Hobert A. Nair, Glendale, Cal. (No. 1,723,804).

Aircraft. John Brookbank, Detroit, Mich. (No. 1,723,914).

Airplane-propelling means. Sherman M. Fairchild, New York, N. Y. (No. 1,723,925).

Folding wing. Frederick R. Weymouth, Hempstead, N. Y.; assignor to Fairchild Airplane Mfg. Corporation, New York, N. Y. (No. 1,723,962).

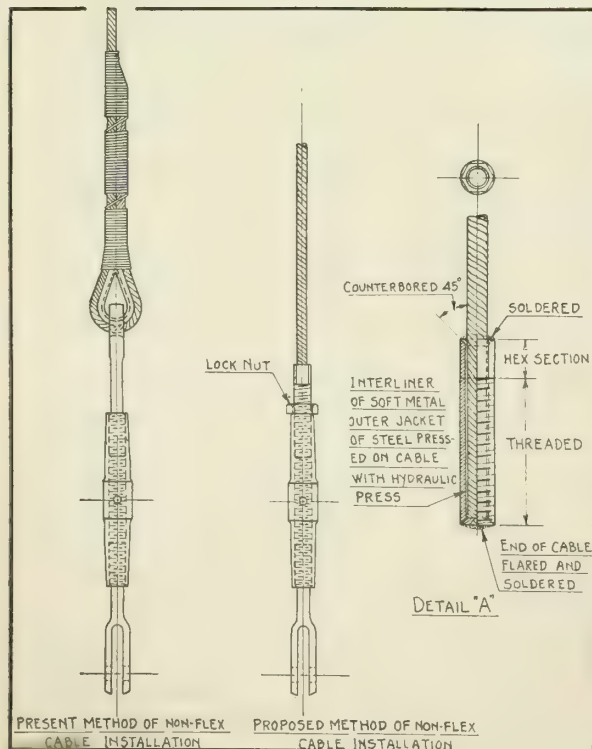
Airplane shock-absorber. Frederick R. Weymouth, Hempstead, N. Y.; assignor to Fairchild Airplane Mfg. Corporation, New York, N. Y. (No. 1,723,963).

Airplane landing. William W. Kellett, Philadelphia, Pa.; assignor to B. B. T. Corporation of America, same place. (No. 1,723,974).

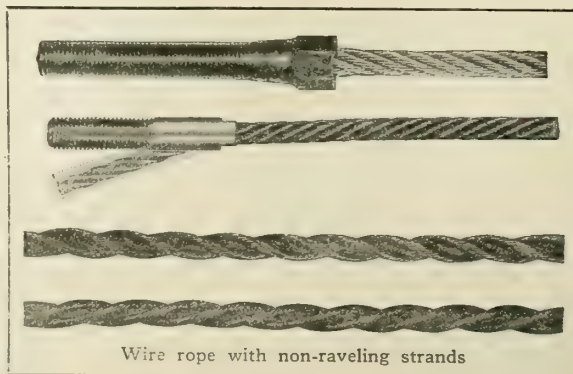
## INSTALLING NON-FLEXIBLE CABLES

SEIZING the ends of wire cables in making splices has always been a problem to contend with to prevent the unlaying of the strands. The American Cable Company has developed a wire rope which has proved in tests to be non-raveling and the strands can be unlaidd and subsequently relaid without injuring the properties of the cable. This cable has also shown that the strands do not have a tendency to untwist under load as have many cables. The individual strands are laid up with an initial twist which allows the cable to be cut at any point without seizing to prevent unlaying. Due to the method of laying up the strands, a large part of the stretch is eliminated and the elongation of the cable approaches closely that of a solid wire, and yet there is no noticeable difference between the flexibility of this non-raveling cable and the standard cable now used.

With the above mentioned features of a wire rope, a very unique method of installing non-flexible cables for aircraft use has been developed for surface controls or wherever the designer is limited to space. The method commonly used for installing such cables requires that the cables be passed over a thimble and through the eye end of the turnbuckle and then held with a serving wire and soldered; whereas with the proposed method a steel sleeve is slipped over the end of the cable and pressed on with a hydraulic press. The sleeve is made of a soft metal interliner and an outer jacket of steel. The compression swedges the fitting onto the cable end and cold flows the metal into the interstices of the cable and thus locks it securely to the cable. The end of the cable is flared out and soldered to provide additional security. Tests have shown that the sleeve held from slipping until the cable broke. The end is threaded and used in the end of the turnbuckle barrel, thus eliminating the eye end of the turnbuckle. With this type of an installation, the space required is cut in half together with the additional advantage of saving the weight of several inches of cable, the serving wire, soldering and the thimble of the present method of installation.



Illustrations below show how the steel sleeve is slipped over the end of the cable and pressed on. The sleeve is made of a soft metal interliner and an outer jacket of steel.



Wire rope with non-raveling strands

A ~ COMPLETE ~ LINE ~ OF ~ AIRCRAFT ~ FOR ~ LAND ~ AND ~ SEA

The Emsco Cirrus  
two-place sport and training  
plane will be of interest to  
prospective dealers.  
See it at the  
Cleveland Show



America's  
safest ~ most  
comfortable ~ medium priced transport plane ~ the

## EMSCO tri-motor CHALLENGER

### PERFORMANCE

High Speed, 130 m.p.h. (1900 r.p.m.)  
Cruising Speed, 100 m.p.h. (1650 r.p.m.)  
Landing Speed, full load, 50 m.p.h.  
Service Ceiling, 15,000 ft.

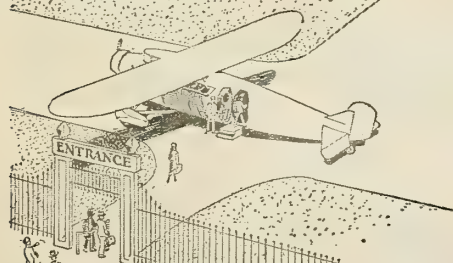
### DEMONSTRATIONS

Arrangements for flights in the Emsco Challenger may be made at the Emsco Aircraft Corporation Headquarters in the Hotel Cleveland or at their exhibit in the Cleveland Show, August 24 to September 2.

DESIGNED from sound engineering principles proven by 15 years experience in commercial and military aeronautics... built by master craftsmen in a modern factory... powered with three Curtiss Challengers the dependability of which has astounded the world, the eight-place Emsco Challenger offers dependable air transportation with maximum safety and comfort.

Only the finest of approved materials are used in the construction. A unique method of insulation reduces cabin noises to a minimum, and the large, luxuriously upholstered, individual chairs assure passenger comfort whether the flight be a hundred miles or a thousand.

First cost is consistent with practical investment and economy of maintenance and operation assures profit. Catalog and prices on request.



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DOWNEY CALIFORNIA





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flying  
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*Aircraft Division*

**BOHN ALUMINUM & BRASS CORPORATION**  
DETROIT, MICHIGAN

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Air Starter  
Crankcase



Carburetor Air  
Heater



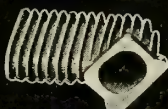
Air Intake and  
Oil Cooler



Inductor Spiral



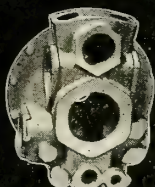
Exhaust Stack



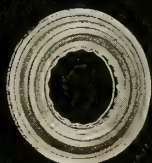
Exhaust Stack



Aircraft Engine  
Cylinder Head



Accessory Drive  
Housing



Inductor Housing  
Cover



Inductor Housing  
Radial Aircraft Engine



Aircraft Engine  
Carburetor Body



Carburetor  
Air Heater

# VISIT THE BOHN BOOTH AT CLEVELAND

Herewith are reproduced a few of the various Bohnalite aircraft parts which will be on display at Cleveland.

Everyone interested in the construction of aeroplanes should visit the Bohn exhibit at the forthcoming Show.

Bohnalite, which is 62% lighter than iron, is more and more being used in aircraft designing.

This organization has a staff of technical experts who are authorities on castings for aeronautical purposes.

*Come in and see us. Bring your blueprints.*

BOHN ALUMINUM & BRASS CORP.  
DETROIT, MICHIGAN  
New York Chicago Philadelphia Cleveland Pittsburgh

# BOHNALITE

**62%**  
**Lighter than Iron**



CHAS. B. BOHN  
*The authority who  
developed Bohnalite*



# THE NEW COMET RADIAL ENGINE

WITH improvements recently embodied in its design, the manufacture of the 150 horsepower seven-cylinder radial air-cooled Comet engine is now being undertaken at a new plant in Madison, Wisconsin, under the supervision of the Gisholt Machine Company. When the Comet engine was first developed it was produced by the Aircraft Engine Corporation of Oakland, California. In March of this year new interests acquired the California company and the Comet Engine Corporation was formed under the sponsorship of Air Investors, Inc., the Crocker First Company of San Francisco and the Gisholt Machine Company. The engine will shortly be put into production in a plant adjacent to the shops of the Gisholt Machine Company in Madison.

The Comet has a  $4\frac{1}{2}$ -inch bore and  $5\frac{1}{2}$ -

rocker-arm and rocker-arm actuating rod, thereby reducing the number of parts required. The center of rotation of the single rocker is so placed that there is very little side thrust on the valve stems; this is possible because of the unusual length of the rocker-arm. As an added precaution against side thrust and tappet wear, rollers are used to contact with the hardened valve cap.

The rocker-arm is positively operated both ways by the cam through a tappet having two roller cam followers. The outward motion—that caused by the outside face of the cam and the outer cam roller—is normal. The inward motion—closing the exhaust valve and opening the intake valve—is accomplished by an internal cam operating on the inner cam roller. This positive action of the rocker-arm has all of the advantages to be gained by using a return spring on the cus-

obtained with the engine warm. This characteristic gives excellent starting and idling characteristics.

The cam is so designed that the rocker-arm is brought almost to a stop between closing of the exhaust valve and opening of the intake valve. The velocity of the rocker when it impacts both with the exhaust valve and the intake valve is approximately 2.5 feet per second. Differing again from conventional practice, the cam which rotates in the same direction as the crankshaft and at one-eighth speed, is carried on a double row ball bearing insuring against cam bearing trouble.

The cam gear drives the two Scintilla magnetos, the tachometer and Heywood air starter. The cam drive countershaft is mounted on two ball bearings, and an extension of the shaft drives the oil pressure and oil scavenger pumps.

A two-piece crankshaft of conventional design is used. It is drilled for lightness and for the oil feed to the crankpin. Particular attention has been paid to securing the proper grain-flow in the crankshaft forging which is of heat-treated chrome-vanadium alloy steel. The same material is used for the one-piece "H" section master rod and the tubular link rods. These forgings are all etched to detect possible flaws after rough machining. Each counterweight is made in two pieces and is attached to the crankshaft extension by bolts in double shear. Additional strength and tightness is attained by tapering the extensions and forcing the counterweights down on the taper before drilling the bolt holes.

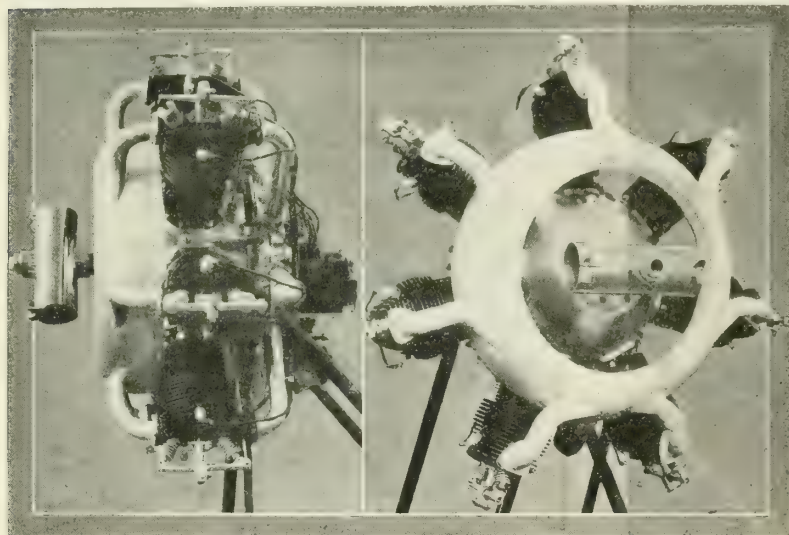
An extension of the crankshaft carries an induction rotor, used primarily to secure good distribution of the gas mixture. The charge is taken in at the center of the rotor, or diffuser, cover from an oil jacketed passage cast integral with the cover. A Stromberg carburetor is used, and an air heater is provided.

The crankcase proper is made in two parts joined in the plane of the cylinder center lines. The bolts holding the two halves together to the rear to take the mounting clamps. The front half of the crankcase carries the front main roller bearing and one of the countershaft ball bearings. Cast integral with the latter are the bosses holding the cast iron tappet guides and the oil sump.

The cylinders are made up of forged steel barrels with integral cooling fins and a cast aluminum head shrunk and screwed on. Aluminum bronze valve seats are shrunk and rolled into the head casting. Both intake and exhaust valves are of a special alloy known as Ferron Chrome. The guides are SAE 62 bronze and are pressed into place.

The master rod of the Comet has been redesigned to give equal stroke and compression ratios on all seven cylinders. This will reduce the length of the cylinder skirts and will make it unnecessary to nick any of the cylinders, as was previously done. The gears in the gear train have been changed to the 20 degree stub tooth form.

(Continued on next page)



The new Comet 7-cylinder 150 horsepower engine

inch stroke, giving a displacement of 612 cubic inches. The engine is manufactured under Approved Type Certificate No. 9 which rates it at 130 horsepower at 1,800 revolutions per minute. The improved engine to be manufactured at Madison develops 150 horsepower at cruising speed. The specific fuel and oil consumption are comparatively low for an engine of this power. The engine weight is 398 pounds.

The valves are positioned in-line fore and aft with the exhaust valve in front. This arrangement reduces the frontal area of the cylinders considerably and results in a corresponding reduction in head resistance.

Valve covers are now being designed to reduce still further this resistance. In addition, this arrangement of valves is advantageous from the standpoint of cooling of the exhaust valve and equalization of cylinder head temperatures.

The valves are operated by a single

tomary rocker without the disadvantage of increasing the cam loading.

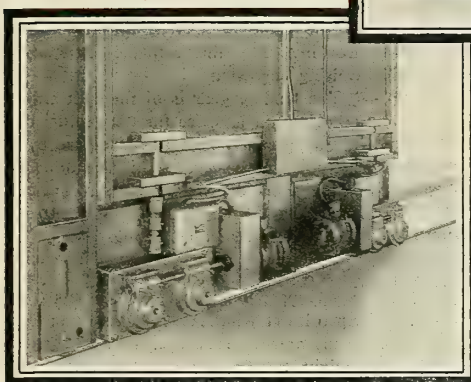
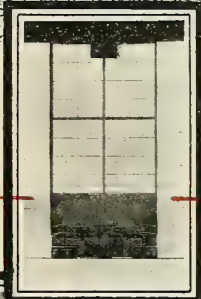
The operation of the exhaust valve is of the conventional type and subject to the same change in timing with change in cylinder temperature. The location of the rocker actuating rod at the rear of the cylinder tends, however, to reduce the variation in timing because the rod temperature increases with cylinder temperature.

The operation of the intake valve is somewhat unique and the intake valve timing, more important than the exhaust valve timing in the operation of the engine, is said to embody several improvements. The intake valve tappet clearance decreases with increase in cylinder temperature, and the intake valve is therefore held open for a shorter period of time when the engine is cold. This permits of the retention of almost a complete cylinder charge and an effective compression ratio even greater than that



At Pontiac  
**ELECTRIC**

one of the doors is an  
**LOCOMOTIVE**



**I**T MOVES. At a touch of a button the door glides along the track, pushing a line of doors around the corner. It moves quietly, at an even speed, opening or closing the entrance in a mere fraction of the time required to do this job "by hand."

The new Allen & Drew Electrical Drive Unit for large installations is easily applied to any standard hangar door. It supports the door on four double flanged wheels, each of which is driven by a worm. Traction is underneath, where it should be. There are no racks, chains or cables, and no heavy upper structure to give trouble. You don't change the hangar at all. Just motorize one door for each track. It acts as an electric locomotive, moving forward or backward, pushing or pulling the doors.

Controlled by fool-proof push buttons on the door itself, or by remote control located at any convenient point in hangar or office. Motorized to operate on your regular lighting or power circuit. Low operating cost.

Quick opening and closing is always an advantage, especially in cold weather. One man can now handle an entire entrance, saving time, labor, and money for you.

Let us submit full information and precise estimate. We can motorize your doors, no matter what type they may be!

*Open  
Sesame!*

See our Exhibit at  
NATIONAL AERONAUTICAL  
EXPOSITION  
CLEVELAND, OHIO  
August 24th to September 2nd  
ESPLANADE — BOOTH B-1



**ALLEN AND DREW Inc.**

Engineers and Manufacturers Specializing in Motor Operated Doors, Windows, Curtains, Stages and other Structures  
NO. 43 BROOKFORD STREET, CAMBRIDGE, Massachusetts



(Continued from preceding page)

materially strengthening these parts. Heat treatment has been modified to give more satisfactory hardness. The number of teeth in the gears has been changed to provide a 1-to-1 drive for the tachometer, which was formerly 21-to-22 drive. The rocker-arms will be supported on two ball bearings. The push rod has been improved to reduce wear and the adjusting nut on the valves has been removed and its construction greatly simplified. A possible source of trouble through the loosening of the adjusting nuts has been eliminated.

The two-piece crankshaft has been changed to include a clamp connection of the two halves which will greatly facilitate maintenance and re-assembling. The propeller hub will be standard SAE 2. The crankshaft extension has been materially strengthened, and the locking of the crank-

shaft pinion nut has been improved. A ring exhaust manifold and cowlings has been designed and can be supplied with the new engines. The mounting of the engine has been changed to make it possible to remove the engine from the plane without removing any engine part.

#### Specifications

Type .....	Fixed Radial
Cooling .....	Air
No. Cylinders .....	7
Bore .....	4½ inches
Stroke .....	5½ inches
Displacement .....	.612 cubic inches
Rated Speed .....	1800 r.p.m.
Power .....	150 h. p.
Max. Fuel Consumption .....	.55 lbs. per h. p. h.
Max. Oil Consumption .....	.025 lbs. per h. p. h.
Weight dry, without exhaust manifold or hub .....	395 pounds

## THE CHAMPION AERO A SPARK PLUG

THE Champion Spark Plug Company is producing a new spark plug for aircraft engines, known as the Champion Aero A. The restricted bore of the Aero A makes possible an extra exposure of the center electrode and the use of a short projection of the primary insulator without impairing the ability of the plug to withstand heat and oil. A secondary dome and sillimanite for insulating material are intended to resist electrical breakdown. Champion special analysis electrode wire is used. The plug is of two-piece construction, including formed gaskets to insure the plug's remaining gas-tight. This plug is suitable for practically all radial air-cooled engines, as well as more modern high compression water-cooled aircraft engines.

## COMMAND-AIRE "DUSTER"

A REVISED version of the standard Command-Aire biplane (Model 5-C-3) produced by Command-Aire, Inc., of Little Rock, Ark., is the Cotton Duster built by that company. The Curtiss Flying Service contracted for six of these ships for dusting operations in Texas. An area of 350 acres can be sprayed in one hour. The Cotton Duster is said to perform and maneuver exceptionally well under all load conditions. The power unit is the Curtiss Challenger radial air-cooled engine of 170 horsepower.

The principal difference between this ship and the Model 5-C-3 is that the forward compartment is closed to provide space for cargo or dusting powder and that the gasoline tank is carried on the under side of the upper wing to allow the necessary space in the forward part of the fuselage. The bin thus provided has a capacity of 550 pounds of arsenate dust.

The fuselage is of welded chrome-molybdenum steel tubing construction without wire bracing, one of the forward bulkheads being detachable to install the especially constructed hopper into the fuselage. Horizontal and vertical tail surfaces, as well as ailerons, are of tubular chrome-molybdenum steel construction joined together by oxy-

acetylene welding. The stabilizer is adjustable in flight to allow for the different loading conditions of the dusting plane during its operation. The fin can be adjusted on the ground.

The wing spars are of solid spruce construction, routed for lightness. The ribs are of Warren truss construction, with spruce cap strips and birch plywood gussets. Tie rods are used in connection with torsion ribs of the box type to render the wing cellule torsionally stiff and take the drag internal, thus eliminating special external drag wires. An extra rib and an extra compression member in the frame provide excess rigidity and torsion strength. Internal wing fittings and tie rods are cadmium plated to prevent rust and deterioration. Each wing frame is finished with Lionoil for moisture proofing. Eight coats of dope and lacquer on the fabric are applied.

Ailerons are employed only on the lower wings, they are of special design—balanced by its shape and especially effective at stalling speed, which is an important factor in severe maneuvers while dusting cotton. All controls are operated by push rods instead of cables. Either aileron may be operated independently should the other get out of order. The adjustable stabilizer is operated

from the cockpit. Stops are provided to prevent the elevator's contacting the rudder. Fabric baffles are installed in five sections of the plane to prevent the chemical from working into the airplane structure and causing corrosion.

The landing gear is of the split axle type, allowing ample space for the venturi tube of the hopper. Wheels and tires are oversize. Fittings on the gear struts are attached by heavy shoulders welded entirely around the strut and the shock absorber is fitted with aluminum streamline fairings.

#### Specifications

Span upper wing .....	31 feet 6 inches
Span lower wing .....	31 feet 6 inches
Wing area .....	303 square feet
Height .....	9 feet
Length overall .....	24 feet 1 inch
Chord .....	5 feet
Cap .....	5 feet
Stagger .....	9 inches
Dihedral upper wing .....	None
Dihedral lower wing .....	2 degrees

#### Weights

Gross weight .....	2,363 pounds
Weight empty .....	1,480 pounds
Pay load .....	1,015 pounds
Fuel capacity .....	40 gallons

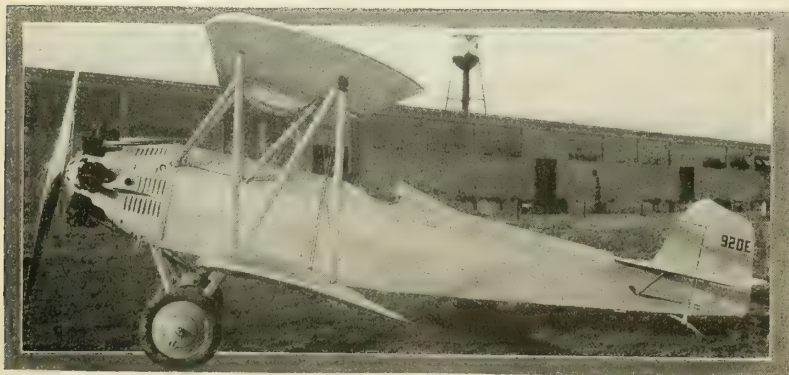
#### Performances

High speed at sea level .....	130 miles per hour
Cruising speed .....	113 miles per hour
Landing speed .....	39 miles per hour
Climb .....	.630 feet per minute
Cruising range .....	520 miles

## PISTON PIN CATALOG

AN aeronautical piston-pin catalog sheet was issued recently by the Burgess-Norton Manufacturing Company of Geneva, Illinois. This sheet is complete for leading popular types of airplane motors. The listing shows the name and year of the motor, the diameter of piston and stroke as well as the number of cylinders.

The Burgess-Norton piston pins are known as "Perfectlap" Pins—this name being descriptive of the high finish given the pin. It is claimed that this high finish reduces running in.

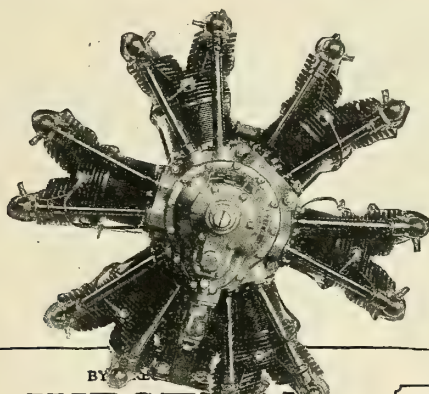


The single-place Command-Aire Cotton Duster with Challenger engine

# TEXACO MARFAK GREASE

## and the

# ENDURANCE RECORD



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NM = Night Message

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RECORD BREAKING CURTISS CHALLENGER ROBIN USING TEXACO MARFAK  
NUMBER THREE GREASE

CURTISS ROBERTSON AIRPLANE MFG CO

PATRONS ARE REQUESTED TO FAVOR THE COMPANY BY CRITICISM AND SUGGESTION CONCERNING ITS SERVICE

When Dale Jackson and Forest O'Brine established their marvelous sustained flight record of 420 hrs., 21 min., 30 sec., a vital factor in their success was proper lubrication of the rocker arm assembly of the Curtiss Challenger engine which powered their Curtiss Robin Monoplane. Texaco MARFAK GREASE No. 3 was used to lubricate the rocker arm connections throughout this surpassing flight.

The importance of specifying a proven lubricant such as Texaco MARFAK GREASE is apparent, when it is recalled that many attempts at sustained flying have failed because of failure of the rocker arm assembly due to faulty lubrication.

Because of the Texas Company's unparalleled distribution in 48 states, Texaco MARFAK GREASE is everywhere available.

## THE TEXAS COMPANY

Manufacturers of a complete line of TEXACO Petroleum Products including  
TEXACO Aviation Gasoline and TEXACO Airplane Oils.

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*The MONOPREP*—Especially designed and engineered for safe, economical training. Puts two ships on the line at cost of one. \$1 per hour for fuel. Students able to fly modern type of plane more quickly. Incomparable for training—Price, \$2,835.

*The MONOSPORT*—For the sportsman pilot seeking high speed, maneuverability, built-in strength, year round comfort and distinctive luxury. Has beaten in speed everything in its class. Custom built for the most discriminating. \$5,750 with Kinner engine, \$6,350 with Warner engine.



## Know These MONOCOUPÉ Facts

More sold during first year of production than any other commercial plane in the history of the industry. Has never failed to win prize money in any race meet though matched against engines of approximately twice its Horse-Power. Fewer fatal accidents sustained out of the large number of Monocoups in the hands of amateurs than by the few well known multi-motored planes piloted by men of long experience. There has never been a structural failure. It is not only approved by the Department of Commerce but all materials and workmanship approved by a government inspector on duty at factory. Lowest priced approved plane in the world. The greatest aircraft value known. Mono-Aircraft planes are purchased with confidence in the responsibility of the Company behind them. Selling the plane and motor as a single unit embraces one of the most comprehensive guarantees known to the industry.

# MONO-AIRCRAFT

# Unrivaled in Value

*The MONOCOACH—De Luxe 4-place cabin plane for private flying or passenger service. Dual control. Powered by Wright Whirlwind J5 or J6. The peer of aircraft value, \$7,950.*



*The MONOCOUCPE—The first successful plane designed and engineered especially for the private flier. Leads all planes in popularity. Highest safety factors. Superior structural and aerodynamic features. Speedy and economical transportation. Unsurpassed value at \$2,835.*

## The MONO-AIRCRAFT Line

represents the most comprehensive values in aviation today. They enjoy those superior advantages in performance, reliability and value which make them the fastest selling line to be had. They have a decisive appeal to the greatest number of prospects. Each model is a distinctive leader in its class.

Unlimited manufacturing facilities, a strong distributor organization and popularity of design have made possible line production methods of manufacture, with rigid government inspection, permitting of the utmost precision in fabrication with great economy—which accounts for the outstanding values Mono-Aircraft offers. Wire, phone or write today for sales franchise information.

# CORP.

*Division of Allied Aviation Industries, Inc.*  
MOLINE, ILLINOIS, U. S. A.



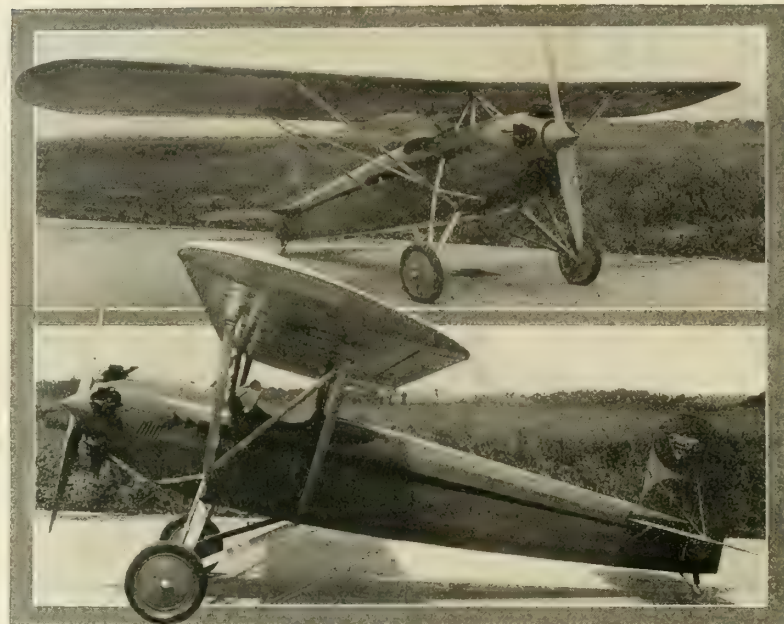
# INLAND SPORT MONOPLANE

**T**HE Inland Sport monoplane is a two-seater light plane manufactured by the Inland Aviation Company of Kansas City, Missouri. Designed by Dewey Bonbrake, aeronautical engineer, it is the result of several years of study, engineering research and practical experience in the light airplane field.

The first ship of this type was tested July 19, 1928, and since then has been flown over 35,000 miles. According to the manufacturer, the ship's inherent stability is such that the Inland Sport has been flown hands off for periods of up to 35 minutes, and it will not go into an involuntary tail spin.

The seating arrangement is side by side, with dual control. A large door gives easy access to the cockpit, which is 40 inches in width. It is upholstered in blue Fabrikoid, with the seat inclined at an angle to give maximum comfort. The side by side seating arrangement was adopted because it is believed to create confidence on the part of the student and because it permits the instructor to converse with and to correct the student's mistakes at the time they occur. A large luggage compartment to the rear of the cockpit provides space for two traveling bags.

The landing gear, which has a wide track and is set well forward to facilitate landings in small and rough fields, is of chrome-molybdenum construction, equipped with



The parasol type inland Sport monoplane with two side-by-side seats.

Oilhydraulic shock absorbers. Tires and wheels are 24 by 4 inches.

Fuselage is of chrome-molybdenum steel fittings and is welded in three master jigs

to assure uniformity and accuracy of construction.

Wings are constructed of routed spruce spars and dural ribs with heat-treated chrome-molybdenum steel fittings. Double drag trussing is employed, composed of tie-rods and welded steel N struts. Ailerons are constructed of chrome-molybdenum tubing and stamped steel ribs. They are differentially operated by torque tubes and streamline push-pull tubes. The tail surfaces are of high aspect ratio; they also are constructed of chrome-molybdenum steel tubing with stamped steel ribs. The stabilizer is adjustable by a hand wheel in the cockpit. The tail skid is mounted in the rudder and moves with it, giving better steering qualities on the ground.

To prevent rust, the fuselage frame, controls, struts, fittings, and all other steel parts are cadmium plated by the Udylite process.

The Inland Sport can be powered by any approved engine up to 110 horsepower, including the LeBlond 60, LeBlond 90, Velie 60, Rover 60, Cirrus 90, Wright Gipsy 90, and Warner 110 horsepower engines.

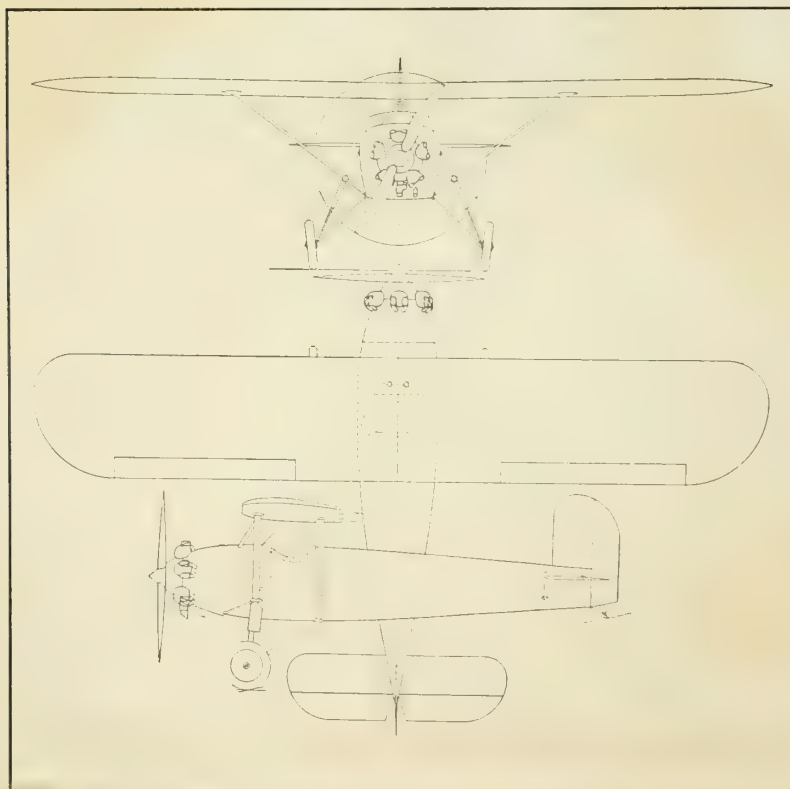
The standard colors are green fuselage and orange wings and tail. Berry Brothers' dopes and lacquers are used throughout.

## Specifications

Span .....	30 feet
Length .....	19 feet 1 inch
Weight empty .....	680 pounds
Disposable load .....	505 pounds
Weight loaded .....	1,185 pounds
Gas capacity .....	25 gallons

## Performances

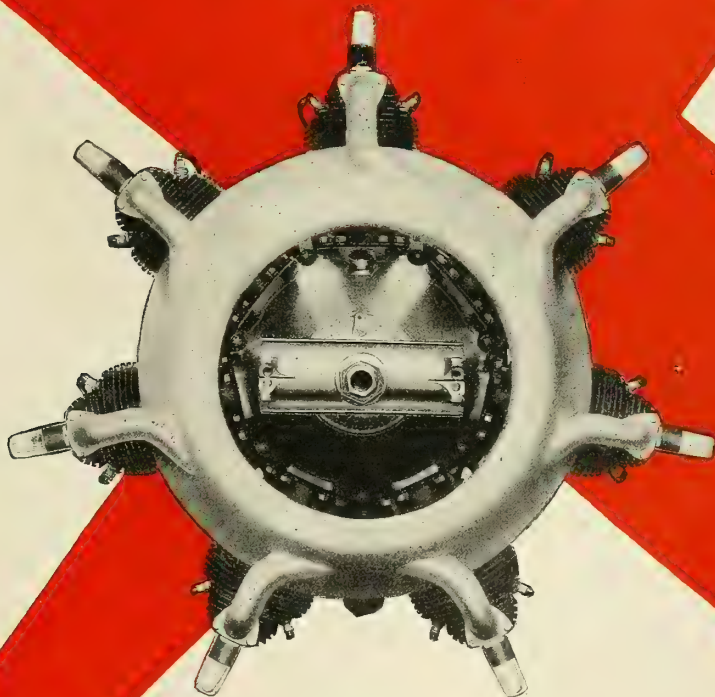
Landing speed .....	39 miles per hour
Cruising speed .....	95 miles per hour
Maximum speed .....	110 miles per hour
Cruising range .....	500 miles



Scale drawings of the Inland Sport monoplane with side-by-side seating arrangement

# COMET

## AIRCRAFT ENGINES



### ABOUT THE COMET...

Design approved by U.S. Department of Commerce . . . 50 hours continuous test . . . Certificate No. 9 . . . in service more than a year on 12 makes of planes.

Manufactured at Madison, Wisconsin, under direction of the Gisholt Machine Company, builders of fine machine-tools in use throughout the world.

Engineering staff headed by men with long experience in Army, Navy and commercial aircraft engine development.

The Comet may be seen at booth 116, Cleveland Air Show.

[7 cylinders---150 H.P.]

## COMET ENGINE CORPORATION

MADISON, WISCONSIN, U.S.A.





## *The New* BELLANCA *Pacemaker*

# The New BELLANCA Pacemaker

*six-place cabin monoplane powered  
with 300 h.p. Wright Whirlwind Nine*

**F**AST, strong and beautiful—built for those who can recognize aircraft excellence—the new Bellanca Pacemaker lays honest claim to the title "America's finest airplane." The Pacemaker is a standardized line-production plane representing all the exclusive principles of Bellanca design, with a refinement of detail and attention to present-day requirements, which once more places the Bellanca far ahead of its competitors.

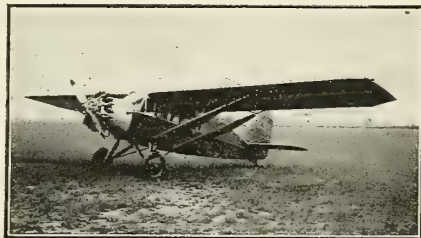
Here are the new features: Wide, sturdy landing gear with oleo shock absorbers. Deeply upholstered individual pilots' chairs and passengers' seats, steel framed. Alemite-lubricated controls, mechanically and aerodynamically finger-light in operation. Bellanca's incomparable cabin coach-work in new hard-wearing materials with the beauty and lustre of silk velvet. Wide-opening doors. Excellent cabin ventilation. Automobile type lift-up cowling. Large baggage compartment. And many other improvements for convenience, economy, and longer service either in airline, private, or industrial operation.

Be sure to see the Bellanca Pacemaker at the National Air Races in Cleveland. Bellanca Aircraft Corporation, New Castle, Delaware.

**Pacemaker Specifications:** Structural strength 12% in excess of Dept. of Commerce requirements. Dual control. High speed, 145 m. p. h. Cruising speed, 122 m. p. h. Landing speed, 48 m. p. h. Climb at sea level, 1,100 ft. per min. Pilot and payload, 1,230 lbs. The Bellanca CH 300 remains in production as a seaplane; it performs at a high speed of 130 m. p. h. and cruising speed of 110 m. p. h.; payload with pilot, 1,230 lbs.



*The Bellanca Seaplane (CH300), powered with the Wright Whirlwind Nine, equipped with all-metal twin floats.*



*The New Bellanca Pacemaker.  
Built under Dept. of Commerce  
Approved Type Certificate No. 129*

# BELLANCA



# HEINKEL CATAPULT

IN consideration of the advantages of forwarding mail more expeditiously from continent to continent, the North German Lloyd, of Bremen, Germany, one of the largest German steamship companies, has equipped its two new giant express steamers, the *Bremen* and the *Europa*, with all installations possible for the purpose of covering the distance between the two continents of Europe and America more quickly than heretofore. The express steamer, *Bremen* has been equipped by the North German Lloyd with a Heinkel catapult apparatus. About 1000 kilometers before the steamer reaches the coast, a Heinkel low-winged plane type H.E. 12 powered with a Pratt and Whitney Hornet engine takes off from this apparatus for the purpose of delivering mail and customs papers in the port of destination ahead of the ship.

About two years ago, construction was started on the first Heinkel experimental catapult, which was erected on a special floating dock. Between fifty and sixty trial starts with various types of planes were made from this experimental catapult. In the course of these experiments, a series of improvements was effected upon the original catapult. These improvements, as well as other details of the catapult, are patented in all the principal countries of the world.

The catapult consists of the rail bearer, the start skid, and the accelerating and testing contrivances.

The rail bearer is a launching-way of framework design. It is made of profile iron on which are erected the rails along which the starting skid glides. The device is so arranged that it may be pivoted into the wind to facilitate take-offs.

The skid is made entirely of high-grade material in order that its weight may be kept down to a minimum. It moves along the rail bearer by means of four gliding shoes. At the forward end of the skid is attached a drag cable, which passes over junction rollers at the front end of the rail bearer and in this way is brought to the accelerating apparatus. The latter is fitted into the rail bearer.

The accelerating mechanism consists of a compressed air container, a cylinder for

gathering energy and the accessories pertaining thereto. The compressed air container, which stores the compressed air necessary for starting the skid, has  $2\frac{1}{2}$  times the cubic content of the cylinder for gathering energy. The stroke of the piston in this cylinder amounts to about a sixth of the accelerating distance on the rail bearer. The drag cable, which passes over the junction rollers to the starting skid, is attached to the piston.

The testing contrivance is for the purpose of ascertaining at any moment whether or not the catapult is in order, without having to put an airplane in the starting position. This contrivance consists of a fly wheel, of which the velocity weight corresponds approximately to that of the airplane, and of a cable drum. When the apparatus is being tested, the cable coiled round the drum is attached by its free end to the skid. As soon as the cylinder is put under pressure, the skid moves forward and so causes the fly-wheel to rotate. The fly-wheel is automatically uncoupled by the brake on the skid at the end of the rail bearer and runs free at the same number of revolutions to which it had previously been brought. The end speed of the skid and the energy of the catapult can easily be read off the revolution indicator from the number of revolutions at which the fly wheel is rotating.

The airplane which is to be catapulted is placed on the starting skid when stationary and is drawn forward at the required speed by means of the accelerating contrivance. The accelerating attachment can be disconnected either by the pilot himself by means of a mechanism on the control wheel of the airplane, or by means of a special starter from the service stand of the catapult. The air pressure necessary for the acceleration of the skid is regulated according to the weight of the airplane to be started and in proportion to the strength of the wind. It is necessary for the cylinder to be put under a lower pressure, in advance, so that the drag cable may remain taut to eliminate jerks.

As soon as the apparatus is put into action the piston begins to work and the

skid is drawn forward at a speed six times greater than that of the piston.

The apparatus is so constructed that the skid, after travelling the first meter, acquires the full acceleration force. A quick release hook, which holds the airplane in its initial position, opens automatically, and at the end of the launchway the brake is automatically put upon the skid by means of a grip acting by compressed air, and which is attached to the top side of the float bearer.

For the North German Lloyd express steamer *Bremen* the Heinkel catapult K-2 is erected on the top deck, almost amidships between the two giant funnels. The rail bearer, which may be turned upon a pivot, rests upon four rollers in a circular rail on which it may be placed in any position desired. In this way it is possible to maneuver the starting bridge up to 90 degrees towards both sides of the ship and further to effect the start up-wind no matter what wind is blowing.

The compressed air required for the apparatus is taken from the compressed air plant which is already on board. The accelerating contrivance is connected with this plant by means of special pipes.

The dimensions of the Heinkel catapult K-2 erected on the *Bremen* are as follows:  
Maximum weight fully loaded....3500 kgs  
Take-off speed .....110 km per hour  
Accelerating distance .....20 m  
Braking distance for the skid.....3 m

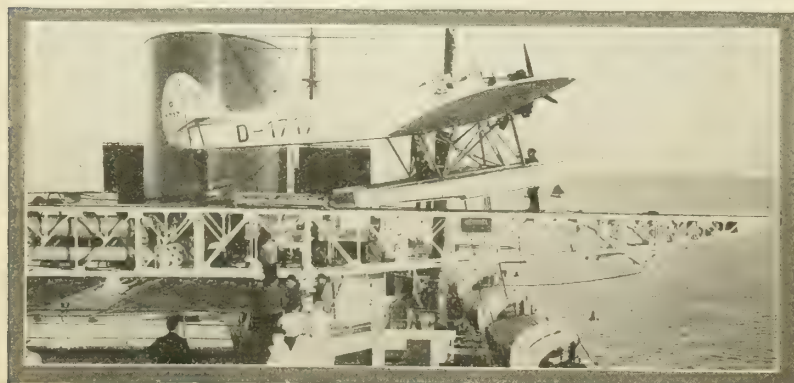
Total weight of catapult with circular rail and pivot but without understructure, without airplane and without compressed air compressor .....24,000 kg

The sea-mail airplane being used is the Heinkel low-wing plane type H.W. 12 with original American Pratt and Whitney 500 horsepower Hornet engine. The dimensions of the airplane are as follows:

Span .....16.83 m  
Length overall .....11.60 m  
Maximum height .....4.50 m  
Supporting surface .....48.50 m  
Weight empty .....1570 kgs  
Load .....980 kgs  
Weight fully loaded .....2550 kgs

## TELEVISION TO BE TESTED ON AIRPLANES

A RADIO television transmitter for airplanes, developed by C. Francis Jenkins, is to be tested shortly at Washington in a laboratory plane. This device employs the use of a television pick-up set installed in an airplane and the transmission by radio of images to a ground receiving station. The first tests are expected to give the device a range of 500 miles. The device to be installed in the laboratory plane is planned to picture the terrain below the moving plane by means of a lens, a scanning disk, a light sensitive cell transmitting the light waves in electric vibrations, and the usual broadcasting equipment.



The Heinkel monoplane on the catapult aboard the steamer "Bremen"



## CONFIDENCE

THE following excerpts were taken from the Log of Capt. W. N. Lancaster covering his flight to Trinidad in an Avian powered with the Cirrus Engine. The Carribean Circle flight has never been successfully completed and to attempt such a flight is supreme evidence of personal courage and extreme confidence in an engine.

### March 3rd—Atlantic City to Hampton Roads

After two hours in the air, wind reached gale velocity and for one hour could make no headway. Rain blinding and incessant. Landed in strong wind and in checking the Cirrus engine, found it perfect in spite of 8 hours flight in rain and worst kind of weather.

### March 5th—Charleston to Jacksonville

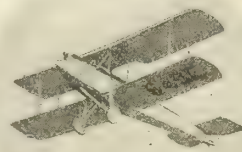
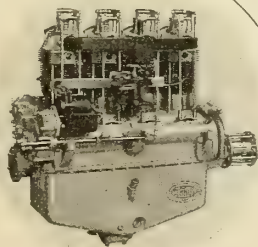
Very soon ran into fog and flew blind for some time. Had to come within thirty feet of sea to see anything. Owing to poor visibility, landed on uninhabited island off the coast at 7:45 and took shelter under the machine. Terrific rain. Took off again at 2:00 P. M. The little Cirrus did not miss a revolution and on checking it at Jacksonville, found it perfect. It has been a gruelling time coming from Newark in the weather I met with.

### March 12th—San Juan to Guadaloupe

At dawn left San Juan for Guadaloupe—400 miles distant over water. Adverse weather and heavy rain continuing for 3 hours. First land I saw was Guadaloupe. Looked for landing field but could see no place fit for landing. Picked flat swampy piece that looked fairly good from air. Made good landing in mangrove swamp. Mud was knee-deep in spots.

Took off from narrow, bumpy runway made by natives for me. Only 750 feet long and must clear trees at end. Loaded to capacity but the little Cirrus got off wonderfully.

These excerpts in their brevity cannot do justice to the real story of the flight but they do show the difficulties encountered and the way the Cirrus Engine overcame them all.



# AMERICAN CIRRUS ENGINES, INC.

WASHINGTON AVENUE, BELLEVILLE, NEW JERSEY



## THE PASSENGER ACCOMMODATIONS ABOARD THE GRAF ZEPPELIN

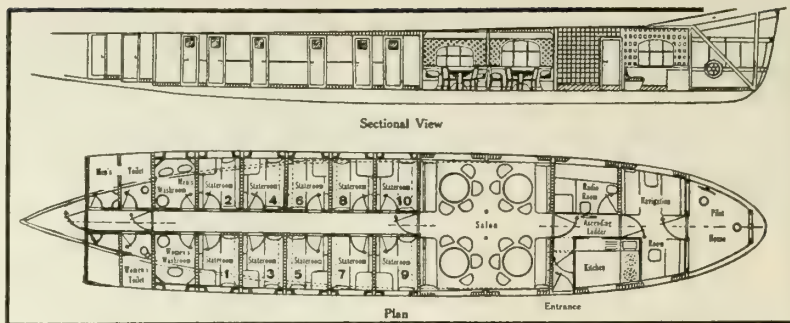
THE entire passenger accommodations of the *Graf Zeppelin* are in the gondola, which is 100 feet long and directly attached to the bottom of the fore part of the airship. The radio room and the navigation room are located in the forward part of the gondola and in the extreme bow is the pilot house which contains the control instruments for operating the dirigible.

Passengers enter the gondola by a ladder on the right side, into a small corridor which opens aft into the attractive and comfortably appointed salon, which is approximately 270 square feet in size, and in which thirty persons can be accommodated during day trips and twenty during normal day and night trips. The salon has two large double windows on each side. Two panes of each window can be opened during flights without creating strong drafts, since the streamlining of the ship obviates this. The walls of the room are of inlaid mahogany up to one-third their height; the upper parts are covered with red silk brocade with which the draperies and upholstery are in harmony.

At meal times the salon is transformed into a dining room where the food prepared in the kitchen is served to the passengers.

The kitchen, forward of the salon, contains all the necessary accessories. The electric stove of aluminum has three heating plates and two ovens for the preparation of hot meals. A closet holds the porcelain and the glassware.

Ten staterooms are located aft of the salon, five on each side of a wide corridor. Each



Gondola of the *Graf Zeppelin*, showing passenger accommodations.

stateroom has a window, and is equipped with a table, two closets, a chair and a comfortable sofa, which at night is converted into upper and lower berths similar to those on Pullman cars. The washrooms, with warm and cold running water, and the toilets, are located aft of the passenger staterooms.

The accommodations for the crew, which averages 30 men, are within the airship proper. There also are the stowage rooms for mail and freight.

## ATOMIC HYDROGEN WELDING PROCESS

BY PETER P. ALEXANDER,

Thompson Research Lab., Gen. Elec. Co.

THE apparatus used in atomic hydrogen welding is very simple, consisting of two tungsten electrodes and an electric arc, established between them, and everything is shielded by a frame of hydrogen. The torch used for welding consists of a support to hold the electrodes, and two tubes directing a hydrogen flame around the electrodes. All energy supplied to the weld is from an electrical circuit. The gas serves

only to shield the electrodes, to protect the metal from oxidation, and to increase the efficiency of the arc.

If the arc of the same current and length be maintained in an atmosphere of nitrogen, the potential drop along the arc core will be about 10 volts per centimeter. When we replace nitrogen with hydrogen, the potential drop will be increased fifteen times, so that by blowing hydrogen toward this arc, the efficiency is increased. In this way it was possible, for the first time, to use the indirect arc in a very efficient way.

There are several processes using the indirect arc for welding but they are inefficient. It is only when air was replaced by hydrogen that the efficiency of the process of indirect arc welding was increased to such a degree that now it is a very successful process.

Since in the atomic hydrogen process the electrodes are nonconsuming, we can add the material to the welded plate from a special welding rod of any desired composition. If you attempt to do so with direct arc, you will find that if the electrode has high chromium or carbon, it will be almost impossible to maintain an arc. However, if the arc is maintained independently, you can use this rod quite easily.

The importance of aluminum and other light alloys is increasing. It is almost impossible to weld these alloys with the direct electric arc. However, they can be welded with gas. Because of the low melting point of these alloys when arc is established between the electrode and the plate, much of the metal is vaporized, but with indirect arc, the temperature may be easily kept within the desired limits.

Hydrogen protects the alloys from oxidation. The greatest obstacle for welding aluminum is the formation of aluminum oxide, which prevents the metal from running together. With atomic hydrogen welding, it is possible to weld aluminum under certain conditions without this danger of formation of aluminum oxide, and it is even possible to reduce the aluminum oxide already formed to its metallic state. Still, it is not practical at the present time to use the atomic hydrogen welding process for welding thin aluminum sheets without fluxes because of the desire to maintain a high speed of welding the thin materials. So that in practical applications of the torch for welding thin aluminum sheets, additional fluxes are used.



A corner of the main salon of the *Graf Zeppelin* airship.

# *History Making Flights*

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First Atlantic Flight by Airship, 1919

First Direct Flight across S. Atlantic, 1926

First Direct Flight England to Australia.

First Direct Flight Cairo to the Cape.

The Flights of Survey to India, Australia and round Africa by Sir Alan Cobham.

Mr. Bert Hinkler's 15½-day Flight England to Australia.

The World Flights of the Marquis de Pinedo.

The 35,000 Miles World Flight by Capt. Costes and Lieut. Le Brix.

The Air Altitude Record (12,739 metres by Herr Neuenhofen, May, 1929).

The Air Speed Record (318.8 m.p.h. by Comdr. Bernardi, March, 1928).

The Air Long Distance Record. (4,860 miles from Rome to Brazil, by Capt. Ferrarin and Comdr. Del Prete, July, 1928).

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# JUNKERS "JUNIOR" LIGHT PLANE

By Ewin P. Heinze

**W**HAT is the first all-metal light plane in Germany is being produced by the Junkers Works of Dessau, Germany. This plane corresponds to the regulations of the FAI and therefore is eligible for participation in light plane competitions.

This new plane, which is called the Junkers Junior, is a monoplane with low set cantilever wings and is designed somewhat similarly to the other Junkers models, entirely of duralumin with steel fittings. The wings consist of three sections, the middle one of which is integral with the fuselage. The end sections are fastened to this by means of four cap nuts. Each end section is built up of four tubular spars joined by open section stays arranged in triangular fashion so that all pressures and stresses are well distributed. The wings, as well as the fuselage, which consists of a number of vertical transverse frames of tubes held longitudinally by the skin, are covered by corrugated sheet duralumin.

This ship has perhaps the smallest span of any German monoplane of this class; it measures only 32.8 feet. The wings have a thick section and taper towards the tips both in their horizontal and vertical planes.

Two comfortable cockpits are provided. Both are equipped with controls of the stick and pedal type, those in the forward cockpit being easily removable.

A 5-cylinder radial Armstrong-Siddeley Genet engine, developing 80-88 horsepower is the power unit. Two tanks, each holding 40 litres, are located in the middle section of the wing, the fuel being fed to the engine by a diaphragm pump. The oil tank holds 12.5 litres and an emergency fuel tank of equal capacity is furnished. The latter is a gravity tank and is filled by a hand pump from the main tanks.

The ailerons, fins and rudders are also made of duralumin and they are hinged in ball bearings. They are operated by rods and cables extending, for the greater part of their length inside either the wings or fuselage. The stabilizer may be adjusted on the ground, but the fin is fixed.

Standard instruments include: Tachometer, oil pressure gauge, oil thermometer, pressure nozzle, altimeter, compass, and clock. Other equipment: Fire extinguisher with pressure gage, Bosch magneto switch and

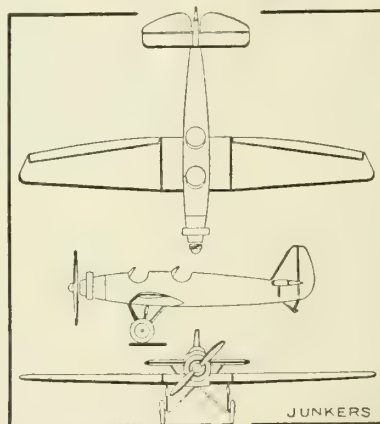


The low-wing all-metal Junkers "Junior" monoplane

starting magneto, primer pump, tool kit, spares for the plane, waterproof covers for wooden propeller and for cockpits.

## Specifications

Span .....	32.8 feet
Length overall .....	22.8 feet
Wing area.....	135.6 square feet
Height overall.....	6.5 feet
Stabilizer area.....	12.9 square feet



Scale drawings showing the outlines of the new Junkers light plane

Elevator area.....	10.7 square feet
Fin area.....	3.7 square feet
Rudder area.....	6.4 square feet
Wheel track.....	5.9 feet

## Weights

Empty weight.....	650 pounds
Pilot .....	165 pounds
Passenger .....	165 pounds
Fuel .....	143 pounds

Oil .....	18 pounds
Luggage .....	70 pounds
Total weight.....	1,211 pounds
Wing loading per square foot....	8.9 pounds
Power loading per horsepower....	15.1 pounds

## Performances

Maximum speed.....	106 miles per hour
Cruising speed.....	87 miles per hour
Landing speed.....	45 miles per hour
Cruising range.....	420 miles
Service ceiling.....	14,750 feet
Time of climb to 3,280 feet.....	5½ minutes

## THE AIR-MAZE ENGINE AIR FILTER

**A**IR-MAZE is an air filter for internal combustion engines manufactured by the Air-Maze Corporation of Cleveland. It is used as standard equipment on Wright Whirlwind and Cyclone airplane engines.

It is a metal gauze filter made up of several layers with an intervening layer of corrugated gauze. It feeds the engine a constant stream of clean air, eliminating the dust and grit from the air entering the engine, and reducing the fire hazard of back-firing. Tests show that the Air-Maze does not interfere noticeably with other normal functions of the engine. It is easily and quickly installed, is self-lubricating and self-cleaning and has no moving parts.

## BALSAM-WOOL

**B**ALSAM-WOOL is a flexible insulator manufactured from wood fiber by the Wood Conversion Company, a division of the Weyerhaeuser Forest Products Mills at Cloquet, Minnesota. It is a sound and heat insulator, and weighs 18 pounds per 100 square feet of ½-inch thickness.

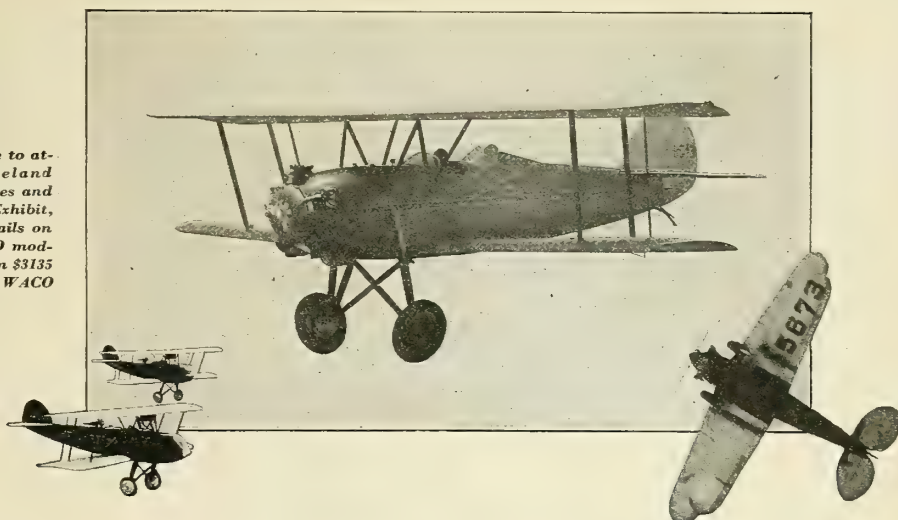
Balsam-Wool is made from the wood fiber of coniferous trees broken down by mechanical and chemical means to an insulating mat that is 92 per cent still air. In the production of the airplane insulation, the mat is lined on one side with waterproof Kraft paper, and on the opposite side with open-mesh cloth. The paper surface is impervious to wind and water, and the cloth surface permits maximum sound absorption.

Balsam-Wool is non-inflammable and a one-inch thickness of the insulator absorbs 56 per cent of a sound at 512 vibrations per second.



An 80-88 h.p. Armstrong-Siddeley "Genet" engine powers the Junkers "Junior"

If you are unable to attend the Cleveland National Air Races and see the WACO Exhibit, send for full details on any of the WACO models . . . priced from \$3135 to \$10,000, flyaway WACO Field.



# At Cleveland . . .

AS USUAL, you will hear a great deal about WACO, especially around the hangars. Listen to the talk of those who know airplanes from experience. Count the WACOS "on the line" . . . watch them in the air . . . see them at the Show.

Consider WACO'S long record of achievements in open competition . . . WACO'S reputation for performance and dependable

service . . . WACO'S proven design and rugged construction . . . and the fact that there are *more* WACOS in use than any other make of commercial aircraft.

Then draw your own conclusions as to whether or not you should find out more about the largest-selling open-cockpit biplanes in America. The information is yours for the asking.

THE WACO AIRCRAFT COMPANY, TROY, OHIO



"ASK ANY PILOT"





## GOLDEN BEAR CABIN PLANE

By HOWARD V. WALDORF

**A** THREE-PLACE Comet-powered cabin monoplane, the Golden Bear, is produced by the Neilson Steel Aircraft Corporation of Berkeley, California. R. F. Korman, formerly chief mechanic of the Mahoney Aircraft Corporation and now chief engineer of the Neilson company, is the designer.

The ship is constructed throughout of steel tubing, with chrome-molybdenum tubing in all the vital parts. All fittings are gusset welded.

The wing is of the semi-cantilever type, with internal bracing of the Warren truss type. The Clark Y airfoil with raked ends is used.

The landing gear is of the split axle type and is equipped with Gruss aero shock absorbers. The wheels are fitted with 30 by 5 inch tires. Johnson roller bearing wheels and a Johnson club tail wheel, equipped with a special Gruss tail shock absorber, are used. The landing gear is strengthened by heat-treated chrome-molybdenum axles, and by a continuous section of tubing from the hub cap to the strut connection.

The cabin is finished with blue mohair and is sound-proofed with a fiber composition. All seats are fitted with spring cushions. The pilot's seat is adjustable and is located in the center of the pilot's compartment. Non-shatterable glass is used in the windows. A large luggage compartment is located aft of the passenger cabin. The stick works on straight pull controls. The stabilizer can be adjusted from the cabin by a special bell-crank control. The elevator is hinged at the front and is therefore adjustable at the rear.

Two special safety features are included in the design. The plane is engineered and fitted for a plane parachute, special fittings being installed in the wing structure above the cabin. It is also equipped with "bail out" doors, which are quickly freed by special releases, in the event that the passengers are forced to leave the plane by parachutes. The pulling of a lever releases the doors, giving the passengers an unobstructed exit.

The Comet 150 horsepower radial engine is equipped with a Heywood starter and two

Scintilla magnetos. Flexible joints in the fuel line eliminate the vibration hazard. Each of two gasoline tanks in the wing has a capacity of 25 gallons.

Although the first model is fabric covered, later ships are to be all-metal. A second

plane, a four-place cabin job, is to be flight tested in the near future. It is powered with a J-6 Wright 300 horsepower engine.

A factory with 16,000 square feet of floor space in the first unit has been built for quantity production of the planes. Thomas Neilson is president of the company, which is incorporated for \$1,000,000.

The tests of the Golden Bear were made by Ray Crawford, Oakland airport flier, from the newly established Berkeley airport.

### Specifications

Span .....	37 feet
Chord .....	7 feet
Wing area .....	260 square feet
Height over all .....	8 feet, 6 inches
Length over all .....	29 feet
Weight empty .....	1,400 pounds
Pay load .....	800 pounds
Maximum speed .....	135 miles per hour
Cruising speed .....	110 miles per hour
Landing speed .....	40 miles per hour
Fuel capacity .....	50 gallons
Normal range .....	800 miles
Rate of climb (sea level) .....	900 feet per min.
Service ceiling .....	16,000 feet
Fuel consumption .....	8 gallons per hour

## KINNER-MOTORED BRUNNER-WINKLE BIRD

**T**HE Brunner-Winkle Aircraft Corp. of Glendale, Long Island, N. Y., a young concern in the aircraft industry, decided last year to produce a plane with a safety factor high above the average. Michael Gregor, Consulting Aeronautical Engineer and the firm's designer, replaced the power plant of the first "Bird" with a Kinner 90 horsepower motor and figures predicted such fine all around performance that the ship was entered in the Guggenheim Safety Competition. It is now undergoing a test at Mitchell Field. An ideal ship, therefore, was created by evolutionary rather than revolutionary design.

Chrome-moly tubing used throughout assures a high safety factor. The motor cowl- ing was developed for perfect fairing between engine and fuselage, and offers very little resistance.

The fuel system is so designed that 5 gallons of gasoline may be switched on for reserve when the main tank is empty. A 3 gallon oil tank is attached to the aluminum fire wall.

The wing design is comparable to slotted wing performance, built up of spruce spars

of novel construction and Warren truss ribs gusseted with plywood.

Controls are push and pull built internally throughout.

The tail group is of welded chrome-moly tubing, fabric covered.

Elevator is controlled by push and pull rod and stabilizer is adjustable from the pilot's cockpit. Rudder is cable operated with disconnection links in front cockpit.

The floor is constructed of plywood.

Dual controls are standard equipment with quickly detachable front stick and removable pin connection from pilot's cockpit on throttle control.

Landing gear is of the split axle type with combination oleo and rubber shock absorbers, providing smooth taxiing. Extra heavy spoked wheels are streamlined with aluminum disks.

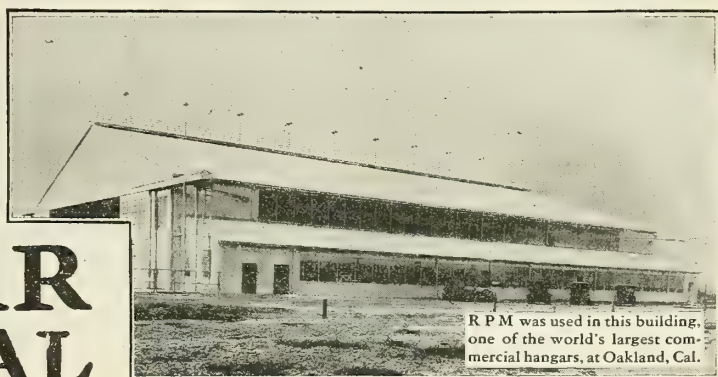
A complete metal turtle deck from nose to tail allows internal inspection of fuselage skeleton without disturbing the fabric covering.

Specifications—Span, (upper wing), 34 feet; span, (lower wing), 25 feet; length, 22 feet 8 in.; height, 8 feet.



The Kinner-powered Brunner-Winkle "Bird" biplane

# A HANGAR MATERIAL



RPM was used in this building, one of the world's largest commercial hangars, at Oakland, Cal.

THAT **1** IS LOW IN FIRST COST

**2** Has practically eliminated RUST, without paint or other maintenance . . . . .

**3** Is backed by a company that has been building hangars since the war days in France

**R**EAD those three points again. How much better a proposition that is to put before the banker who is to finance your hangar . . . or before a private investor . . . or before your appropriations committee.

No longer need you tie up the thousands upon thousands of dollars that are required for a hangar of heavy construction.

On the other hand, you no longer need fear that a hangar of low cost means a hangar that will rust away on you . . . or a hangar that will call for expensive upkeep. Here is a material for roofs and sidewalls of hangars which combines all the

good qualities of the old unprotected metal without its tendency to rust . . . and most of the permanence of heavy construction without its great cost. This material is RPM (Robertson Protected Metal).

It has been used on hundreds of hangars. The United States Government alone has used more than 7,000,000 square feet of it for hangars.

Let us submit to you an estimate of the cost of your hangar with RPM. No obligation. Or we will be glad to have a Robertson representative appear before your banker, or your appropriations committee to discuss a hangar project.

H. H. ROBERTSON CO., PITTSBURGH, PA.

# ROBERTSON

*Has the Experience*

WORLD

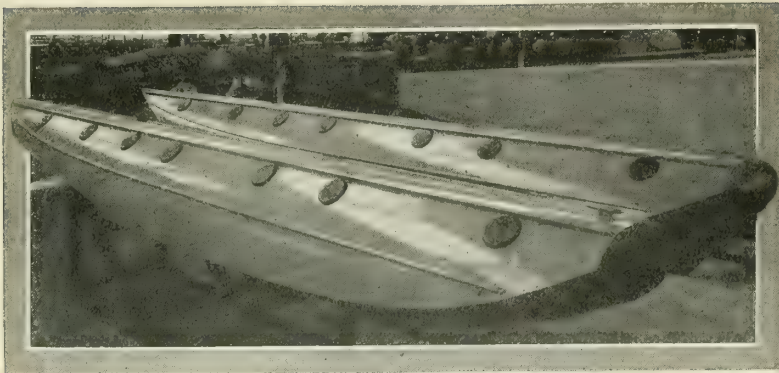


WIDE

See our exhibit at the National Aeronautic Exposition, Booths 52 and 53, at Cleveland, Ohio, August 24 to September 2, 1929.

BUILDING SERVICE





## FAIRCHILD PONTOONS

**T**HE hollow "V" bottom is incorporated in all pontoons manufactured by the Fairchild Airplane Manufacturing Company, because this type bottom improves planing qualities.

Fairchild pontoons are of the composite type, an all metal shell of duralumin plate, sufficiently thick to give ample strength and durability, bolted together and fastened to the internal wood frame with special duralumin bolts. The bottom construction is so designed that it is capable of absorbing a considerable shock, such as encountered in taking off or landing in a heavy sea. Since the internal structure is of wood, its resilience absorbs local stresses and prevents them from concentrating on individual fastenings. This form of construction has the further advantage that any small leak becomes self-sealing through the tendency of the wood to swell when moistened.

Ample strength is obtained by bracing the all metal shell with laminated spruce ribs at frequent intervals. In addition, a frame made up of spruce members of duralumin gusset plates is run the length of each float on its center line, and this forms the backbone of the float. Ribs and bottom stiffeners are spaced more closely together in the portion just forward of the step where the loads are heaviest. The hollow "V" sections of the bottom, together with a strong athwartship stiffener at each rib, gives an exceptionally strong bottom construction

which has been static tested to loads far above any that are usually met in landing.

A bulkhead of duralumin stiffened with spruce diagonals and gusset plates is fitted at the points of attachment of front and rear struts for the purpose of distributing the strut loads. These two bulkheads divide each float into three watertight compartments which are made accessible through the hand holes provided. All internal connections are carefully joined and anchored with duralumin plate fittings and duralumin bolts.

A strong external keel and duralumin chafing strips are run along the bottom of the float to protect it from damage on beaching or in the case of hitting an obstacle while planing. The chines on each side are covered with an external angle of 1/16-inch metal for protecting the edges of the float. Ash stiffeners are run along the deck about 6 inches on each side of the center line to provide a place for walking. These features further increase the longitudinal strength and stiffness.

Because of the tapered stern and balanced proportions of the floats, their air resistance is decreased to such an extent that ships on which they are used can obtain almost the high speed as landplanes of the same type.

The canvas nose bumper stuffed with kapok serves a dual purpose; it not only streamlines each float, but it also protects the nose from contact with buoys, service rafts, motor-boats and docks.

On the top of each float a walking strip is fastened by machine screws so that it can be readily removed, thus exposing a 9-inch opening which affords convenient access to

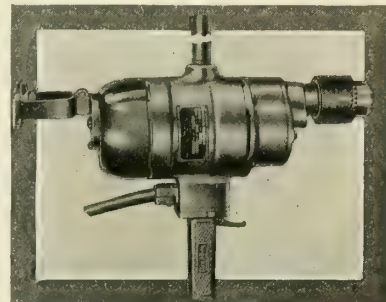
the inside of the float. The bolted type of construction used adapts itself readily to ease of repair, and the internal structure is made accessible by means of large hand holes and the removable walking strip.

The high freeboard combined with the correct proportions of length and spacing of the floats makes the completed airplane thoroughly seaworthy. The ample reserve buoyancy combined with the high freeboard insures safe mooring in bad weather. The floats are maneuverable under all circumstances, and although water rudders are optional, they have been found unnecessary.

A tube is fitted to each pontoon just forward of the step so that an axle can be readily inserted through the float and JN wheels slipped on each end. This makes a "built-in" handling truck on which the ship can be handled with facility around the hangars and on the beach.

## VAN DORN DRILL

**T**HE Van Dorn Electric Tool Co. has announced a new 3/4-inch electric drill equipped with a chuck for straight shank



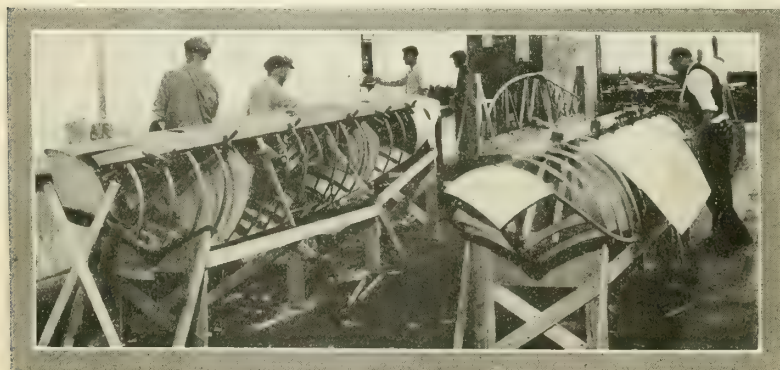
The new type Van Dorn drill

bits and drilling capacity of 3/4 of an inch in steel. Because of its rugged construction, power, and low speed, it is suited for driving rigid set cylinder grinders and hones. It is driven by a Van Dorn-built motor equipped with ball bearing armature and automatic safety switch.

## CONSOLIDATED TYPE N TACHOMETER AND ALTIMETER

**T**HE Consolidated Instrument Company of America, Inc., has announced the development of a new tachometer and a new altimeter which incorporate advanced principles in instrument design. The new navigational equipment is designated as type N.

Type N tachometer is equipped with helical gear drive, which insures smoothness and quietness of operation. Another advancement which the manufacturers claim for this instrument is lessened needle vibration. This tachometer has a perfectly uniform scale over the entire dial. The new Consolidated type N altimeter is equipped with barometer setting scale, so that where barometer pressures are known at various points along a line of flight, the pilot can correct his altimeter readings at these points for varying barometric pressures.



Applying the duralumin covering to the wood frames of Fairchild floats

# Every Parks-Trained Transport Pilot is in a well-paying position today

## Aviation Has Plenty of Money, But Not Nearly Enough Skilled Flyers

So serious is the shortage of Licensed Transport Pilots that every man trained for this work at Parks Air College is working right now and being paid big money for his skill.

This shortage of Transport Pilots is getting more acute. Factories are making planes and the public is buying them faster than pilots can be trained. Students more and more are finding themselves stepping almost automatically into positions paying upwards of \$3,600 a year—more than the cost of the complete course—as soon as they receive their Transport Pilot credentials.

Nowhere can you get these creden-

tials any more quickly, or more certainly, than at Parks Air College, the biggest and finest flying school in America, the school that got transport approval from the United States Department of Commerce without a moment's preparation for examinations.

## Parks-Trained Pilots Preferred Where Others Must Wait

So widespread is this school's reputation for high standards and absolute thoroughness of training methods that its graduates quickly discover that Parks-trained pilots are preferred.

Leaders in aviation, one of the richest of modern industries, know Parks Air College like a book. They know it to be

modern and complete in the most trifling details. They know of its staff of long-experienced pilot-instructors, none of whom has less than 1,000 hours in the air to his credit.

They know that all the school equipment, including the big fleet of open-cockpit and cabin ships, is new and kept up in the best of condition. They know that a man trained at Parks Air College has been TRAINED RIGHT, that he has had the best instruction possible, that he is a man with an assured future in the air.

## 6,188 New Ships Each Year With Only 4,160 Pilots to Fly Them

The Commerce Department has just announced that new planes are being licensed at the rate of 6,188 a year, new pilots at the rate of 4,160. That means there are only two-thirds as many new pilots as are needed to fly these ships. It means that each year there are 2,028 ships forced to stay on the ground because the highly paid, highly skilled men needed to take them up are lacking. There's opportunity for you!

Get into aviation! It's one of the most fascinating things on earth today. It's chockful of future for men of foresight and, above all else, action. Action is the very backbone of this ever-growing work. Let your first action be the filling in and mailing of the coupon below. Now!



*Largest Civilian Air School in America!*

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*Parks Air College has been rated by the Aeronautics Branch, Department of Commerce, as an Approved Transport Ground and Flying School*

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Send me your illustrated catalog. I am interested in Aviation.

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# FOREIGN NEWS IN BRIEF

Compiled from reports from AERO DIGEST'S correspondents, the Automotive Division and the Transportation Division, Bureau of Foreign and Domestic Commerce

## ENGLAND

**N**ATIONAL Flying Services, Ltd., a recently formed English aviation organization, has inaugurated a departure in popularizing flying by giving trial flying lessons. For a fee of two guineas (about \$10) those who aspire to fly can try the experiment of actually controlling an airplane under the guidance of an instructor at the new London Air Park at Hanworth. The lessons include preliminary tuition on the ground, when the instructor explains the action of controls, followed by half an hour in the air in a dual control training machine, when the pupil is given a practical demonstration of piloting, and can take over the controls and fly the machine for a few minutes at the direction of the instructor.

**I**MPERIAL AIRWAYS, LTD., has ordered a fleet of 40-passenger airliners, each fitted with four engines totaling 2,000 horsepower from Handley-Page, Ltd., for use on the London-Karachi air service. The new air liners in which the passenger cabin, being clear of the propellers' slipstreams, will be almost noiseless, represent a notable advance in commercial aircraft design according to the manufacturers.

**T**HE Simmonds Spartan and the Blackburn Bluebird IV light airplanes have been adopted by National Flying Services, Ltd., London, to form the nucleus of their fleet of training and touring machines, which will be stationed at their system of flying centers. Both types will be fitted with the Cirrus Mark III air-cooled engine of 85 horsepower.

Orders are being placed immediately for the major part of the flying stock required for the equipment of the London Air Park at Hanworth and the ten provincial air

parks which are included in the first part of the company's scheme. A total of 54 aircraft of various types will be provided as the full complement.

Capt. T. Neville Stack, A. F. C., has been appointed chief pilot to the company and will be in charge of all flying operations. Capt. the Hon. J. B. Rodney, M. C., has been appointed senior pilot at the London Air Park and in charge of the Hanworth Park Country Club. A total complement of 54 pilots will be required in the course of developing the London and provincial air parks now planned.

## New Defense Plane for Royal Air Force

**A** SINGLE seater plane constructed entirely of steel, built for the home defense force, and having as its main purpose the bringing down of invading enemy bombers before they have an opportunity to get over London or other strategical points, has been added to Great Britain's air forces, according to recent reports by officers of the Royal Air Force. The machine is able to take off within a minute and climb to a height of nearly four miles in thirteen and one-quarter minutes. At that height it can maintain a speed of 185 miles an hour. It is fitted with a super-charged and specially geared Jaguer motor developing 400 horsepower. With a full load of machine guns and munitions, the pilot can climb to a height of more than six miles above ground level.

**T**HE Gloster Aircraft Company of Cheltenham, England, has designed a new photographic plane for surveying the British dominions. It is a twin-engined all-metal biplane. The pilot sits at the extreme nose of the machine, while a companion, lying full length in the compartment behind, shoots pictures of the ground beneath.

## FRANCE

**M**ILLE. MARYSE BASTIE on July 29 broke the woman's solo endurance record by flying above Le Bourget Field, Paris for 26 hours, 46 minutes. Mlle. Bastie had already won the women's world record for distance flying from Paris to the Baltic Sea, a distance of about 937 miles. During part of her flight Mlle. Bastie had to contend with heavy rains and winds. She flew a Caudron monoplane powered with 40 horsepower engine.

## HOLLAND

**D**URING the first six months of 1929, the regular air services of the Netherlands East Indies carried 6,002 passengers over a distance of 120,000 miles. Of these, 3,639 passengers flew the Bandoeng route, 847 the Semarang route, and 1,516 were carried on special flights. Only 3 of the 1,480 scheduled flights were not made, and those due to bad weather.

**T**HE Royal Netherlands Indian Airways are operating services between Batavia and Bandoeng and between Batavia and Semarang in the Dutch East Indies. From Semarang there are two train connections with Sourabaya, so that it is possible to make the journey from Batavia to Sourabaya in one day. As soon as the airdrome at Sourabaya is completed, a direct air service will be established between Batavia and Sourabaya, covering the distance in about 5 hours.

## Ross Hadley in Europe

**R**OSS HADLEY, president-treasurer of the Pacific Aeromotive Corporation of Los Angeles, Calif., with Mr. and Mrs. Bert Prinsen Geerlings of the K. L. M.-Royal Dutch Airlines have been touring Europe in a Stearman plane equipped with a Whirlwind engine. Mr. Hadley is now en route to Tokio, Japan, in the American-made plane.

**A**IR mail service has been extended from Rotterdam or Amsterdam, Holland, to Marseille, in order to connect with fast steamers from that port to the East Indies. The air mail charge for this service is equivalent to two cents for two-thirds of an ounce or fraction. Mail for Australia, Tasmania and New Zealand is carried three or four days faster than ordinarily by the payment of the equivalent of 12 cents extra for air mail.

Dutch mail destined for Switzerland and Italy is carried without an air mail charge, and without special request on the part of the mailer. Air mail and parcel post addressed to Spain go by train to Basle, Switzerland, and then by plane to Spain. Ordinarily mail for Sweden, Denmark, and Norway is forwarded by air without an air mail charge and without specific instruction.



Ross Hadley (left) with Mr. and Mrs. Geerlings at the Waalhaven aerodrome, Holland

# Abrasives in Industrial Progress



**Alundum**  
and  
**Crystolon**

*Norton Electric  
Furnace Abrasives,  
important agencies  
in the making of  
the machinery of  
commerce and pro-  
duction the world  
over.*

In the constantly expanding domain of machinery about which the progress of the human race centers, the influence of abrasives in industry is constantly widening. Abrasives are today outstanding factors in low cost and high rate of production of machinery and tools.

The grinding machine and the grinding wheel perform countless precision machining operations.

The basic materials of the grinding wheel have been turned also to other uses, such as the manufacture of Refractories and Laboratory Ware, Non-Slip Floors and Porous Plates for sewage disposal.

NORTON COMPANY

WORCESTER, MASS.

# NORTON

Grinding Wheels  
Grinding Machines



Refractories-Floor  
and Stair Tiles



## GERMANY

[EDWIN P. A. HEINZE]

MUCH attention has been roused in Germany by the many successful American refueling flights. This practice is seriously being considered with a view to making it available under practical service conditions, because its successful application would make possible long distance non-stop flights with heavy loads. Authorities have a special interest in this development in connection with the big German flying boats, which would experience less difficulty in taking off from the water if they could dispense with some of their fuel until they were in the air. The principal difficulty in the way of this development in regard to German flying boats is that these planes have their engines situated above the wings, and are of the pusher type.

The German Aeronautical Research Station has started experiments with a new form of refueling apparatus. The refueling plane with this device will not fly above but below the plane to be refueled, and the fuel will be forced up by pumps.

THIS year the Deutsche Luft Hansa celebrates the tenth year of its commercial flying in Germany. Although the first German airways company, the Deutsche Luft Reederei, was founded in 1917, it was not until 1919 that the first regular line was inaugurated. It was a mail line, and the ships plied between Berlin and Weimer, where, during the first months of the young German Republic, the first National Assembly was gathered. A few weeks later the second line, Berlin-Hamburg, was started, and in quick succession further lines were opened. At that time there were numerous small companies starting mail and passenger services, but many of them soon ceased to function, or joined the Aero Lloyd, a large combine that had been formed in the meantime. In 1923 the Junkers company left the Aero Lloyd and started an extensive air service of its own. In 1926, under pressure from the federal governments, the Deutsche Luft Hansa was united with the Aero Lloyd and the Junkers services.

German air traffic has seen many vicissitudes during these ten years, especially as a result of the Treaty of Peace, which made the development of suitable commercial aircraft, and especially of motors, very difficult by regarding construction as disguised military machinery. Only gradually, as the good will of Germany became apparent, were the stringent limitations relaxed so that Germany could develop her commercial flying to the height it now commands.

There is one airplane still in service that was used in the first commercial service. It is a Junkers all-metal monoplane of the F13 type. This type of machine has been so uniformly successful that it is still being built today with but slight alterations.

THERE is another tenth anniversary to record in Germany—that of the inauguration of the famous glider camp in the

Rhoen hills in the south of Germany. Where ten years ago a few tents and a poor barrack marked the site of a few enthusiastic sail fliers, there today stands a neat little village with its own postoffice, hotels, paved roads and even a police station. It is still exclusively an airmen's camp.

News just comes of a fine glider-soaring feat accomplished by the well-known young sail-flier, Krönfeld of Vienna, now in the Rhoen camp. Krönfeld, who only a few weeks ago sailed a distance of 62 miles measured in a straight line, now has succeeded in flying 93 miles across the Thuringian hills.

A FEW weeks ago the German Aviation Union, a popular league spread over the whole of Germany and fostering airmindedness in all classes of the population, held its twenty-third general meeting. The German Transport Minister, to whose administrative sphere aviation belongs, attended in person for the first time, accompanied by several leading men of his ministry. The Minister had cordial words of recognition for the fine work that had been done in the past few years by the union in spite of the financial difficulties that so greatly impede progress of the aerial sports movement in Germany.

THE Tempelhof airport located in the center of Berlin has been greatly improved during the last year. The main building has been extended, new large terraces have been added with cafes and restaurants, and new offices have been built. On the field, additions have been made to the concrete runways. The men in charge of the administration of the airport greatly deplore the fact that all German machines are still being equipped with skids only. These tear up the field constantly, and cause much unnecessary expense. German aircraft engineers have an aversion against tail wheels and wheel brakes.

Four other airports are planned around the outskirts of Berlin, two of which are already in existence. The purpose of these plans is to provide special flying fields for school and sport, or private flying, for freight traffic, for scientific work, and for flying boats or other water machines. In this way the central airport will be relieved of much traffic, and will be used solely for passenger service. The auxiliary ports lie between 10 and 16 miles from the central port and will be valuable also as emergency landing fields. The water port will probably not rise to any great importance except as a flying area for aircraft builders. The Albatross works are situated in the immediate vicinity of this port.

THE Junkers company at Dessau has developed a starting rocket to give airplanes additional power and speed for taking off when heavily loaded. The rocket device was tested on August 9, using a Bremen plane type W 33 on the Elbe River. A number of rockets were arranged underneath the wings of the plane and were started by electricity. The plane was shot forward, and rose from the water easily. En-

gineers of the Junkers firm state that, with further developments, six of the rockets will lift an airplane with a load of 11,000 pounds into the air.

For some years past the Junkers company has been developing a Diesel engine for aircraft, and the work is now so far advanced that several trial flights have been made successfully. The engine has six vertical cylinders, water-cooled, with two opposed pistons in each, the upper one being connected with the crankshaft by a cross-head and long connecting rods. The power-plant works on the two cycle system; and is very economical, requiring about 20 per cent less fuel than the usual engine. The machine delivers 600 horsepower as a constant, and 700 horsepower as a peak output, the latter at 1,680 revolutions per minute. The weight amounts to 1,763 pounds, or almost 3 pounds per horsepower of the constant output. This is, to some extent, offset by the fact that the engine requires less fuel to be carried for a given distance than would be required by another power-plant.

FIFTEEN pilots of the Deutsche Luft Hansa have passed the examination in seamanship and deep-sea navigation at the nautical school of the organization at Lübeck in preparation for the time when a regular transatlantic passenger service with sea-planes or flying boats will be established.

NIGHT flying over the German air routes will be intensively developed during the next two years, according to present plans of Deutsche Luft-Hansa and the Signaldienst fuer Luftverkehr. Six new night routes will be added to the two now lighted, joining the most important cities of the nation.

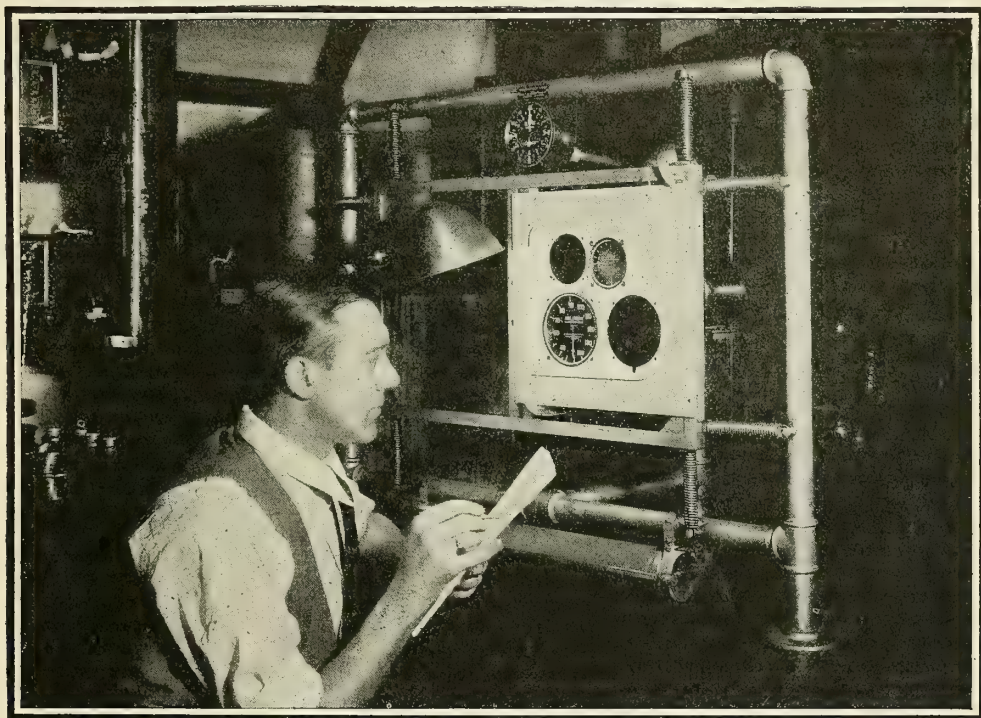
ACCORDING to recent reports, the Silesian section of the German Aeronautical Association is financing the expansion of the gliding schools of that country. Among others, the school in Grunau in the Riesengebirge is so benefited. Since its inauguration in 1924 this school has graduated 250 gliding pilots.

## SWITZERLAND

A DEVICE has been perfected by a Swiss engineer which permits delivery of small packages of mail from a plane in flight, according to a report from Switzerland. The apparatus consists of an aluminum shell equipped with a precision watch. A waterproof sack is attached under the shell, and at the top of the shell a small parachute lies folded in a frame. The weight of the apparatus is 7.9 pounds. It can carry a weight of 8.8 pounds. When flying over the point at which mail is to be dropped, the pilot may adjust the precision watch according to the indications on the altimeter and throw the carrier overboard.

The carrier falls like a dead weight until about 300 feet above the earth, when the watch releases the parachute and the package lands slowly at the spot aimed at. A larger model of the apparatus has been developed which will permit the lowering of objects weighing as much as 66 pounds.

# IMMUNE TO VIBRATION



## THE PIONEER . . . . VIBRATION TEST STAND

Electrically operated and adjustable  
to produce vibrations of varying am-  
plitude and intensity. ★ ★ ★

With the Pioneer Vibration Test Stand, our engineers  
study the effect of vibration on aircraft instruments.

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craft Instruments that are immune to errors, as well as to the  
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Pioneer Instrument. This is but one of the reasons for Pioneer accuracy, en-  
durance and dependability. . . . Most of the vital parts of an airplane you  
cannot see. But Pioneer Instruments are a mark of quality—look for the  
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## CANADA

[JAMES MONTAGNES]

LIGHT beacons will be installed along the Montreal-Windsor airway at Walkerville, London and Hamilton. Smaller beacons will be placed at intermediate points, the work being done for the proposed winter services along this airway. The route was opened for air mail recently.

GREAT WEST AIRWAYS, LTD., is to be taken over by the Boeing Airplane Company of Canada, according to negotiations reported between the two concerns. Great West Airways is a bidder for the Calgary-Vancouver air mail contract.

CHINESE citizens of Toronto are representing their native country with six airplanes, which will be shipped from Toronto to the Orient. Four of the ships are destined for Nanking as training ships for commercial pilots, and the other two will go to Canton. The planes were paid for by voluntary subscriptions collected during the past year.

## Canadian Aeronautical Chamber of Commerce

THIRTY-FIVE Canadian Aircraft representatives have formed the Canadian Aeronautical Chamber of Commerce to advance the aeronautical interests of the Dominion. When governmental approval is received, the organization will be incorporated.

The purposes of the Canadian Aeronautical Chamber, as set forth in tentative by-laws drawn up, include the promotion of trade with Canadian aviation interests, the distribution of information concerning the industry, the advocacy of laws favorable to aeronautics, the adjustment of difficulties within the industry, and the acquisition of property.

THE Canadian Government is spending about \$140,000 this year for the promotion of flying clubs. Most of this money will be spent on airplanes to be presented to the clubs. Flying club membership in the Dominion is now over 3,400 with 260 members flying solo. There are 142 private licenses among the club members and 45 commercial tickets.

THE Winnipeg Flying Club, at its first annual meeting reelected J. A. Sully as president. The club has experienced a very successful year and has had 1,760 hours of flying with no serious accidents. Because of this record it is the only club in Western Canada that can get crash insurance.

There are plans for a new clubhouse and tennis court and a drive for a membership of 475, twice that of the present. It is expected that parachutes will be purchased for those members who wish to practice aerobatics.

WESTERN Canada Airways, Ltd., has established a seaplane base at Prince George and daily flights are being made to the Ingenika mining country with a Fokker Super-Universal.

## WESTERN CANADA

[C. D. McCABE]

IN preparation for the air mail service across Western Canada the Department of National Defense has sent out Major W. A. Steel of the Royal Canadian Signal Corps to establish radio beacons between Winnipeg and Banff, Alta. The present plans call for night flying, leaving Winnipeg about 10 p. m. with mail, and arriving at Banff about 6 a. m., in time to catch the west-bound trains that carry the mail through the mountains to Vancouver. It is planned to establish radio stations at Cordova, Man., and Regina, Sask., this fall, and at Maple Creek, Sask., and Calgary, Alta., in the spring. At the time, plans are being made for emergency landing fields, and the establishment of visual beacons on the regular airports.

MAJOR-GENERAL J. H. MACBRIEN, president of the Aviation League of Canada, is making a trip across Canada in his Gypsy Moth. After inspecting the various flying clubs in the east he flew on to Winnipeg, and thence to Regina, to attend the convention of western flying clubs. The plane is the standard Moth used by all flying clubs with the exception of an extra fuel tank which gives it a cruising range of about six hours. Proceeding on from Regina the general will visit at Calgary, and then fly across the mountains to the Pacific coast.

AIR mail service for Western Canada has been definitely assured and the entire contract for service between Winnipeg, Regina, Saskatoon, Edmonton and Calgary was allotted to the Western Canada Airways of Winnipeg. It is intended that this be all-night flying, but since the beacon, emergency landing fields, direction lights, etc., that are being prepared by the Department of National Defense, will not be ready until late in the fall, the Post Office Department has announced that there will be a day-light service, similar to that of last December, for a month before the night equipment is ready.

WITH five new light aeroplane clubs throughout the country already operating this year, five others are struggling to complete their organization and to claim the government grant of two machines each, but only three will get their equipment on this year's vote, it is stated by the Department of National Defence.

At the present time, it is said, the three clubs most likely to receive their machines during the summer are those at Brandon, Man.; Brantford, Ont.; and Stratford, Ont.

ANOTHER very important victory was made by the airplane when it was announced that the aerial dusting of the forests against the spruce bud worm plague was found to be very successful. The government sent its big trimotor plane into the Western Ontario district and the Dominion entomologist, Dr. J. M. Swaine, reported the dusting to be very effective and may save millions of dollars worth of timber.

## MEXICO

[MONT HURST]

PERMISSION has been granted to construct an airport on Cordoba Island, which lies near Juarez between two forks of the Rio Grande River. Hangars, offices, passenger station, customs quarters, post-office, radio station, telegraph office, hospital, and restaurant will be erected.

GEORGE L. RIHL, manager for the Cia. Mexicana de Aviacion, recently announced that improvements will be made on all of the company's fields and airports in Mexico. Over eight hundred thousand dollars will be spent in improvements. Fields to be enlarged and improved include those at Tejeria, Tapachula, Merida, San Jeronimo, Villahermosa, Campeche, and Tuxpan.

THE ministry of communications and public works of Mexico has granted four concessions for air mail, passenger and freight routes in the country, covering five thousand miles. Three of these have been granted to Fernando N. Gonzalez. One route will be from Mexico City to Tia Juana, lower California, with twelve important stops. The next will be on the Guatemalan border and will link Colima City and Suchiate with intermediate cities. A mail, passenger and freight air line will be started between Mexico City and Ciudad Juarez, on the border. This was let to Mario Gomez Daza, acting for Carlos Alarcon.

THE Mexican government has granted three air concessions, from San Luis Potosi to Matamoras, to Manzanillo, and to Piedra, Negras, respectively, to Edward Meade, of Mexico. The San Luis Potosi to Matamoras route is by way of Tula and Ciudad Victoria, a distance of 399 miles. The San Luis Potosi to Manzanillo route will be via Leon and Guadalajara, approximately 320 miles, while the third route, from San Luis Potosi to Piedras Negras is via Zacatecas and Torreon, 585 miles.

THE National Bureau of Aeronautics of Mexico is constructing a civil airport at Mexico City, 5,750 feet by 2,560 feet, containing 255 acres at a cost of \$500,000. The field will be permanent, and is managed by the National Government. The field lies 1,900 feet east of the city and next to the military field of the same name, "Valbuena." It is being built on a former lake bed, reached from the heart of the city by automobile in 10 minutes. The surface is level, grassed and has artificial drainage. There will be 3 paved runways 96 feet wide and 4,000 feet long. There are no obstructions near the field nor markings on it. An airplane-shaped wind indicator is in operation. There will be a beacon light visible 62 miles, yellow boundary lights, approach lights, floodlights and runway lights. A large hangar is under construction. There will be a meteorological station, telephone, telegraph, first aid, and dining service, sleeping quarters and fire apparatus. The military field nearby is well equipped for day or night flying and has direction-finding apparatus.

# FEATURES THAT MAKE "THE FLEET" AN ECONOMICAL PURCHASE



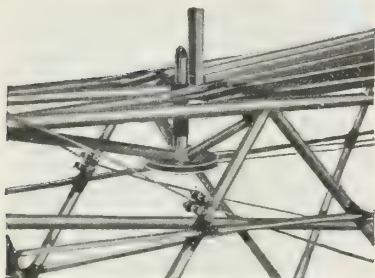
**F**ROM the propeller hub-nut to the trailing edge of the rudder, quality is the dominant keynote of "The 1930 Model Fleet". Built to fulfill every pertinent requirement of sport and flying instruction . . . to fly with strength factors well in excess of Army, Navy and Department of Commerce requirements—"The Fleet" possesses innumerable features which are not found in the usual commercial training plane . . . reasons why "The Fleet" can truly be described as the plane which is built to a standard . . . not to meet a price. On the pages that follow you will be shown graphically a few of the unique and distinctive features that make "The Fleet" an economical purchase.

## FLEET AIRCRAFT

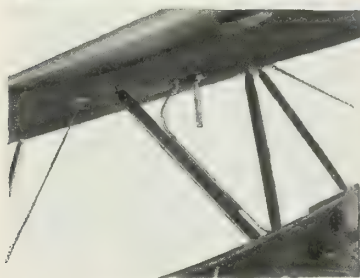




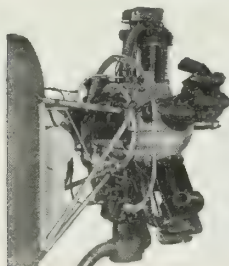
**1** Installation of extra fuel tank for cross country flying ... affords total fuel capacity of 50 gallons which provides 7.5 hours endurance at cruising speed.



**2** Stabilizer is adjustable from either cockpit while in flight. Fin is adjustable on ground.



**3** The fuel tank is in upper wing ... positive gravity feed ... patented fuel gauge accurately records level of fuel. Tank can be drained in any flight position.



**4** The engine is bolted to a patented three-point engine mount which absolutely prevents crankcase distortion.



**5** Bucket-type parachute seats are standard equipment. Rudder pedals are used in place of usual foot-bar. Elevator is operated by push-pull tube.

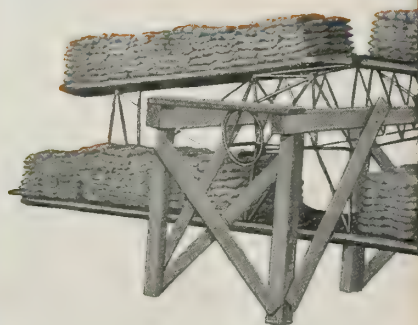


**6** Each cockpit is provided with a safety-pad on instrument board to minimize danger of injury in accidents. Unobstructed vision and easy parachute exit are provided.

# FOURTEEN RE "THE F IS AN ECONOM



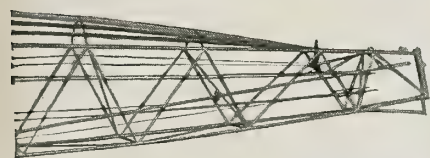
**7** Welded fuselage construction ... no tie hermetically sealed to prevent internal corrosion. Strength factor requirements are exceeded in all



**8** Wing cellule in static test carried actual greater than Department of Commerce

## FLEET AIRCRAFT BUFFALO

# ASONS WHY LEET" ICAL PURCHASE



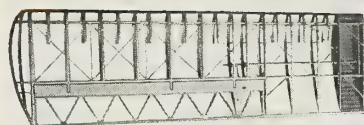
rods . . . alloy steel tubes oiled internally and  
rosion. For safety, Department of Commerce  
instances . . . in many cases more than 300 per cent.



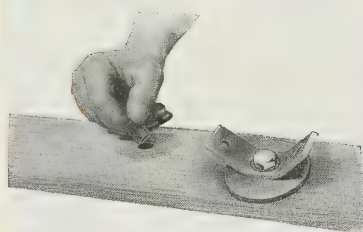
load of almost 7 tons—nearly 50 per cent  
requirements.

## INCORPORATED NEW YORK

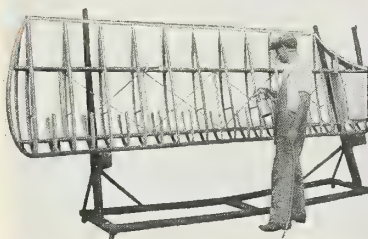
Wings are of all-metal **9**  
construction with exception  
of spars and ailerons. Ailer-  
ons are operated by push-  
pull tubes.



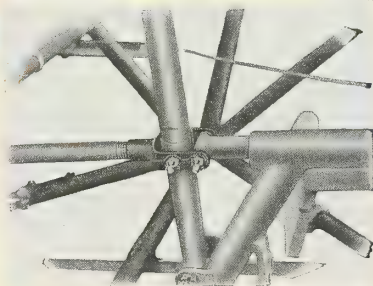
To increase bearing area **10**  
in the wood and to prevent  
play developing in service  
. . . every bolt piercing the  
wing spars is surrounded by  
a large diameter bakelite  
bushing. This is one of the  
many refinements which give  
"The Fleet" long life.



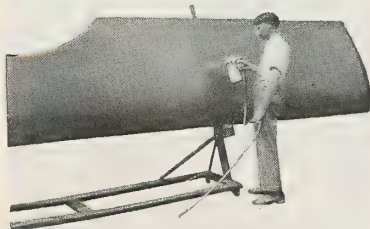
All wood parts are pro- **11**  
tected by three coats of first  
grade spar varnish . . . one  
more coat than required by  
the Army and Navy. This  
thorough protection not only  
prolongs the life of the plane,  
but makes it serviceable in  
all climates.



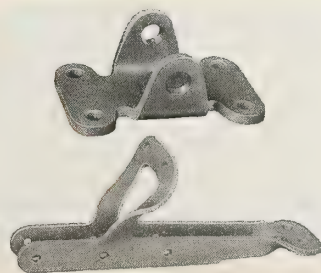
Wherever there is ap- **12**  
preciable motion between  
bearing parts, bronze bear-  
ings are employed . . . add-  
ing considerably to both the  
life and workability of the  
parts.



To provide a more sub- **13**  
stantial and beautiful finish . . .  
six coats of dope are used  
on all fabric parts. Ordinarily  
four coats of dope are  
considered sufficient.

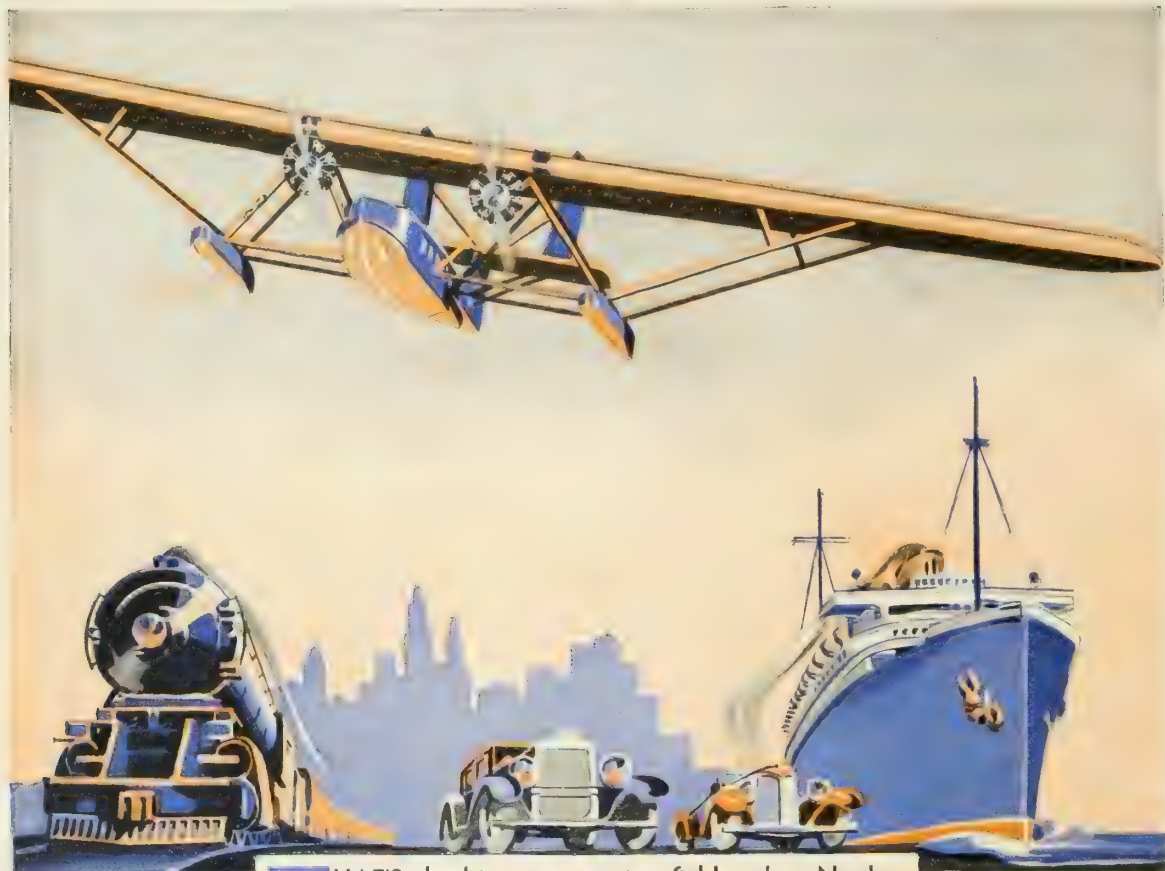


Wing fittings and other **14**  
metal parts are cadmium  
plated . . . a more costly pro-  
cess than zinc plating, but  
three times as effective  
against corrosion. Every part  
is painted after plating.





# RAILROADS · STEAMSHIPS · AUTOMOBILES AND NOW AIR TRANSPORT

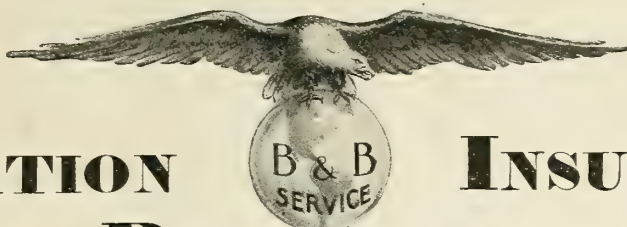


**T**HAT'S the big transportation field today. North—south—east—west—it is daily growing in importance in every progressive community. The groping, pioneer days are over. Requirements and possibilities are known and anticipated..capital is deeply interested..and freely invested. If you—or a group of your business associates are interested in this rapidly developing field—you want full information.

Facts—graphs—charts—verified figures—have been prepared to help you. They show how and why The Commodore, (luxurious commercial prototype of the Consolidated Patrol Flying Boat PY-1, now used by the Naval Air Service), is especially adapted to the immediate and growing needs of air transportation. The Commodore is an all-American product—all parts are standardized—an important fact in assuring minimum maintenance. Write for data today concerning your particular transport problem.

The Commodore has an overall length of 60 feet and a wingspread of 100 feet. It is built to carry a useful load of 8000 pounds, with passenger accommodations for 20 persons, and cargo capacity of 200 cubic feet. Cruising range 1000 miles at 110 miles an hour.

## CONSOLIDATED AIRCRAFT CORPORATION BUFFALO, N. Y.



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**FIRST** to construct and supply aviation finance insurance, dealers' and manufacturers' blanket policies, airport and airmeet liability policies, and policies covering beyond the United States.

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**ALONE** in maintaining an engineering and advisory service covering the entire country and serving all interests.

**ALONE** in having developed a world-wide organization whereby American exporters of aircraft may secure adequate insurance and in addition, foreign local engineering and advisory service.

**ALONE** in having paid more aviation claims than all other aviation insurance organizations.

**ALONE** in being favored with the major part of all available aviation insurance business.

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*The foregoing facts are the result of maintaining consistently over a long period of years B. & B. SERVICE, STABILITY AND SECURITY*

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# WESTERN NEWS

## COAST TO COAST IN A FOKKER F-10

By F. E. SAMUELS

ALWAYS having had a desire to cross the continent in one of the great transport planes, it was with pleasure that I accepted the invitation of Paul E. Richter, Jr., of the Standard Airlines, Inc., to be a passenger, ferrying one of their first trimotor Fokker F-10s from the Hasbrouck Heights, New Jersey, Fokker factory to Los Angeles. To say that it was an enjoyable trip is putting it mildly. A combination of beautiful weather, a comfortable and roomy cabin and a speedy ship, with pleasant and genial fellow travelers, made the trip one never to be forgotten.

Taking off from Hasbrouck Heights, July 23rd at 11:15 a. m. with Jack Frye, president of Standard Airlines, and Hughy Wells, research pilot of the Bendix Co., at the controls, we were soon across New Jersey and into Pennsylvania, following an almost due west course over the Delaware water gap. Across the Allegheny mountains, we circled the Pittsburgh Municipal Airport at 2:55 p. m. Then a southwest course to Wheeling, West Virginia, landing at the flying field of the Fokker factory, right on the bank of the Ohio River, where we were to take delivery of the second of the fleet of F-10s. After fueling both ships, we decided to stay at Wheeling for the night.

We were a little late in getting away Wednesday, but at 9:15 a. m. both ships took off. Hughy Wells had transferred to the Wheeling plane, and, with Paul Richter, was piloting that plane. Jack Frye and Les Carson remained at the controls of the first ship. Flying high, we passed over Columbus, Ohio, at 10:20 a. m., Dayton, Ohio, at 11:15, and were across Indiana to Terre Haute just as the whistles blew at noon. Still following a course almost due west, we crossed Illinois, and arrived for lunch and fuel at St. Louis, Mo., at 2:45 p. m. Here we were fortunate in seeing the *St. Louis Robin* refueling on its record breaking endurance flight. At 3:35 p. m. we took the air again. We crossed the Mississippi River, and the entire state of Missouri, on a southwest course into Oklahoma, arriving and landing at the Tulsa airport at 6:50

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p. m.: a day's flying of eight hours and forty-five minutes, crossing six states, West Virginia, Indiana, Illinois, Missouri, Ohio and part of Oklahoma.

With an early start Thursday at 6:40 a. m. we passed near the *Texan* and the *Californian* in the air, flying due south, across Oklahoma into Texas, where we landed at Dallas at 9:05 a. m. Both planes were kept busy for three hours, flying the officials of the Texas Pacific Railroad, their relatives and friends. At 12:05 we took off again. A short hop of 30 minutes brought us to Fort Worth, Texas, where we again landed. Fifteen minutes later we were in

the air, and headed due west across Texas. We landed at Midland at 3:20 p. m. Setting back the time one hour, we took off from Midland at 3:30 p. m. Still flying west, we arrived at El Paso, the present eastern terminal of the Standard Airlines, at 5:40 p. m., where a large crowd had gathered to meet the new ships of the line. Our last night of the trip was spent here, after a day's flying of seven hours and thirty-five minutes, crossing the entire state of Texas, from east to west.

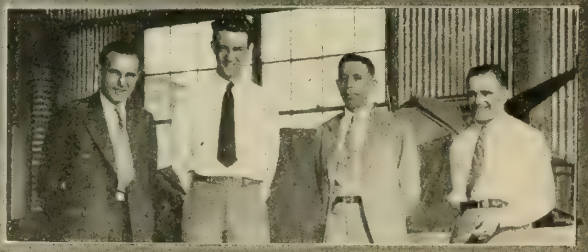
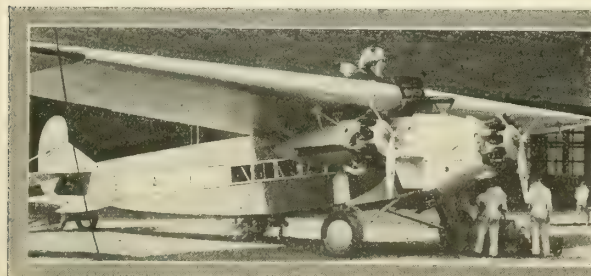
After a comfortable night's sleep we took off from El Paso, Friday at 8:10 a. m. Two hours flying on a southwest course brought us to Douglas, Arizona. An hour's stop was made here to allow the crowd to examine the new ships, then away at 11:15 a. m. Northwest then, for one hour and ten minutes, landed us at Tucson, Arizona, where we stayed for twenty minutes, taking off on an almost northern course for an hour and ten minutes, and arriving at Phoenix, Arizona, at 1:55 p. m. Here we fueled the ships and went into town for lunch, not starting on the last leg of our wonderful trip until 4:00 p. m.

Across the Arizona desert we flew, at a cool and comfortable height of nearly ten thousand feet. We passed directly over Coachella, Palm Springs, Banning and Beaumont, over the orange groves of Riverside and Orange counties, and the beautiful farms and the great oil wells of Southern California. Slowly we descended, and at 6:30 p. m., Pacific Coast Time, we made a three-point landing at the airport of the Aero Corporation of California, headquarters of the Standard Airlines, where a tremendous crowd had gathered to greet us and to examine the beautiful ships. A day's flying of seven hours and fifty minutes was completed. The total flying time from coast to coast of 27 hours and forty minutes brought to a close a transcontinental trip seldom equalled.

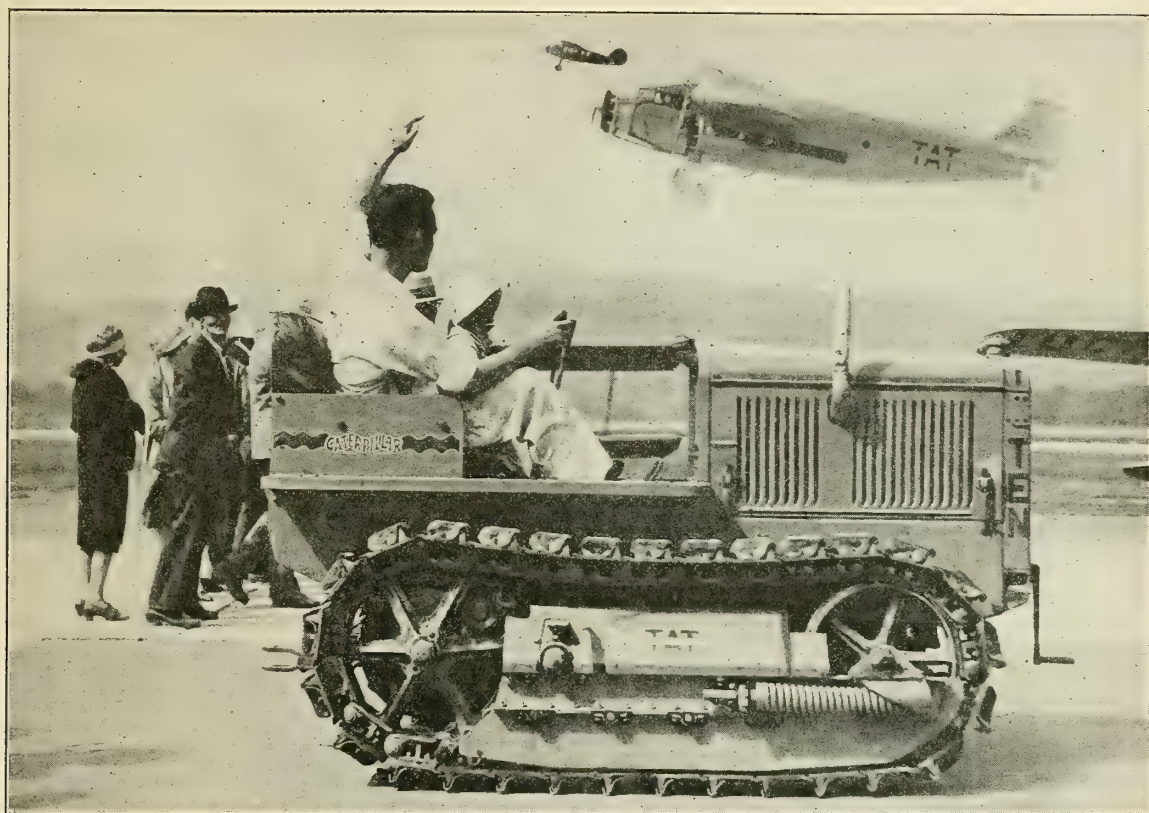
Among the passengers who made the whole or part of the trip were Erle P. Halliburton, J. A. Chilton, F. S. Luqueer, Roy Ambler, Mr. and Mrs. Albert K. McLeod, Mr. and Mrs. Hughy Wells, R. B. Armstrong, Miss Estelle La Branche, James A. Phillips, R. W. Cantwell, Harry de Pauer, George S. Behrendt, A. E. Cameron and L. A. Carson.



A "Standard" Fokker over Mt. San Jacinto



Fokker leaving factory at Wheeling, and, left to right, Hughy Wells, Jack Frye, Erle P. Halliburton, and Paul E. Richter, Jr.



# Happy Landings, T. A. T.

Every Transcontinental Air Transport field from Los Angeles, California to Columbus, Ohio is maintained by "Caterpillar" Tractors. Here is the initial flight from Los Angeles, Colonel Lindbergh himself as the pilot. "Caterpillar" track-type Tractors clear and level the airports, dig drains, keep them smooth, move the big planes around—make themselves useful in a score of ways that mean money saved and convenience added.

*Prices—f. o. b. Peoria, Illinois*

TEN . . . . .	\$1125	TWENTY . . . . .	\$1975
FIFTEEN . . . . .	\$1500	THIRTY . . . . .	\$2475
SIXTY . . . . .	\$4300		

## Caterpillar Tractor Co.

PEORIA, ILLINOIS and SAN LEANDRO, CALIF., U. S. A.  
Track-type Tractors / Combines / Road Machinery  
(There is a "Caterpillar" Dealer Near You)

**CATERPILLAR**  
REG. U. S. PAT. OFF.  
**T R A C T O R**





Bach 10-place transport, which recently set a new high altitude record with a payload of 2,220 pounds

THE Aero Corporation of California has increased by three states its territory for the distribution of Fokker planes. The former contract held by the Aero Corporation provided for the sale of single-engined Fokkers only, in the states of California and Arizona. This has been increased so as to include that part of the state of California lying south of and including the counties of San Luis Obispo, Kern and Inyo; the entire states of Arizona and New Mexico; and that part of Texas lying west of and including the counties of Dawson, Midland, Martin, Upton, Pascos, Terrell and Gaines. The new franchise also grants the distributorship for the sale of trimotor Fokkers, as well as those powered with single engines. The Aero Corporation of California is also an authorized factory service station for Fokker planes.

### TRIMOTOR FOKKERS PLACED IN SERVICE ON STANDARD LINE

FOKKER F-10 super trimotor passenger transports were put into service on the Los Angeles-El Paso airline of the Standard Airlines, Inc., on August 4. On that date three of the new 12-passenger ships were christened with appropriate ceremonies along the air route, at Los Angeles, El Paso and Phoenix.

The inauguration of the new equipment on the Standard Airlines system was celebrated by chambers of commerce and other civic organizations in towns served by the line. The Los Angeles Chamber of Commerce prepared over 7,500 congratulatory booklets made in the shape of an orange. These were fastened to carnations and dropped over cities on the initial flights of these new planes between Los Angeles and El Paso. The Phoenix Chamber of Commerce prepared over 10,000 booklets containing a congratulatory message to the Standard Airlines, and also containing a brief history of the company and its officials. Both Douglas and Tucson each prepared an elaborate dedication program.

The F-10 trimotors replace the single-engined Fokker planes formerly used on the service, which were too small to handle the

increased traffic over the route. The new transports are of standard Fokker design with all-wood full cantilever type wings with a 79-foot span. The length is 50 feet, and the height 12 feet 8 inches. Powered by three Pratt and Whitney Wasp engines of 425 horsepower each, these planes have a high speed of 145 miles per hour, and a cruising speed of 125; with only two engines working, the plane can cruise at 104 miles per hour, has a high speed of 118 miles per hour, and is able to climb 640 feet per minute.

The passengers' cabin on the Fokker super trimotor is 16 feet long, 5 feet wide and 5 feet 9 inches high. Two baggage compartments are available. The cabin is heated and ventilated, and is finished in mahogany, with full-length sliding glass windows beside the passenger armchairs.

OVER a dozen Ryan Broughams have been shipped to China, besides numerous other shipments to Great Britain, Italy, South America and various parts of Europe. Steel, Inc., of Los Angeles, has been appointed export representative for Ryan Broughams, except in China, Mexico and Canada. They have agreed to handle twenty-five ships a year.



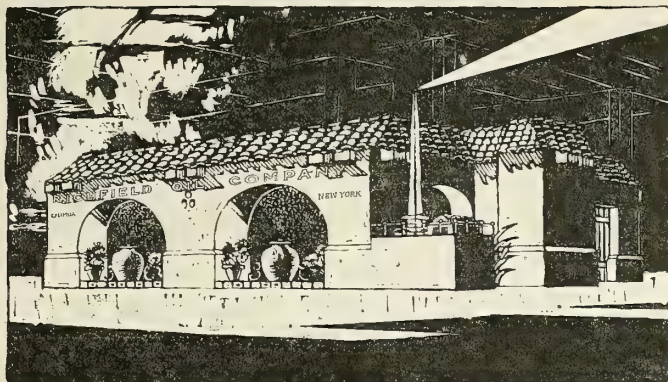
Waterman preparing for altitude flight

### PILOTS BACH PLANE TO HIGH ALTITUDE WITH PAYLOAD

PILOTING a trimotored Bach monoplane to a height of 20,000 feet, Waldo Waterman, manager of the Metropolitan Airport, Los Angeles, and test pilot for the Bach Aircraft Company, recently set a new American payload altitude record for a three-engined plane. On his flight, in which he carried a deadweight load of 2,220 pounds, equivalent to fourteen passengers, averaging 160 pounds each, Waterman used a stock ten-place passenger transport plane, manufactured in the Bach Aircraft Company's factory at Metropolitan Airport, San Fernando Valley, and used Union aviation gasoline and aero oils. The former American payload altitude record of 16,732 feet, made with a load of 1,000 kilograms, approximately 2,200 pounds, was held by Capt. Harold Harris of McCook Field, Dayton, Ohio.

The plane piloted by Waterman was powered with a 525 horsepower Pratt and Whitney Hornet in the nose, and two five-cylinder Wright J-6 motors on the wings, capable of developing 150 horsepower each. The deadweight load consisted of sandbags which were weighed by Joe Nikrent, official timer of the National Aeronautic Association, prior to being placed in the plane. The sealed barograph carried on the flight will be checked by the Bureau of Standards before the record is made official. The gross weight of the plane, including the deadweight load and 200 gallons of gasoline carried on the take-off, was over four tons.

Two altimeters were installed in the plane for the altitude test. At the peak of the climb one registered 20,000 feet, and the other 20,400 feet. Waterman stated the plane climbed the first 18,000 feet in forty minutes, and that it required nearly an hour to pull it up the other 2,000 feet to 20,000. He was in the air two hours and twelve minutes. He used an oxygen smoking set, made by Capt. Cecil Virdin of the Los Angeles Fire Department, instead of the oxygen mask frequently worn for high altitude flight.



*Richfield invites You  
to visit  
Its Aviation Display  
at the  
Aeronautical Show  
Cleveland  
Aug. 24 - Sept. 2*



**RICHFIELD OIL COMPANY**  
*California New York*



## LOS ANGELES SHOW

AN aeronautical exposition will be held at Los Angeles from November 9 to 16, sponsored by the California Aircraft Exposition Association. The show will be managed by the aeronautical Exposition Corporation, show division of the Aeronautical Chamber of Commerce of America, Inc.

The exposition is classed as a Class B regional show, and will be held in the show building located at Fairfax and Wiltshire Avenues, Los Angeles. The structure offers 150,000 square feet of space for display. Clifford W. Henderson will be in charge of the show management. Officers of the California Aircraft Exposition Association include Fred A. Worthy, president, Harry Wetzel, vice president, Waldo Waterman, vice president, G. E. Moreland, treasurer and Frank Bireley, secretary.

## CONTACTS

[By F. E. SAMUELS]

ON August 6th the Professional Pilot's Association held its regular monthly meeting and election of officers for the ensuing year. Matters of importance were discussed, and an enjoyable evening was spent. The Board of Governors of the Association appoint the presiding officer for each meeting, and all committees are made up from the board. The following board was elected for the ensuing year: Maurice Graham, Waldo Waterman, Roscoe Turner, Wally Timm, Eddie Bellandi, Moye Stevens and Palmer Nichols. The association is in a better financial condition than it has ever been before, and a number of applications for membership are being acted upon at each meeting.

THROUGH the courtesy and invitation of the Pacific Aeronautical Corporation I had the pleasure of a trip in the trimotor Ford plane of the Wright Aeronautical Corporation, in which Bruce G. Leighton, director of sales, George Chapline, director or service and Mr. Jankowsky, mechanic, of the Wright company, are touring the country, testing and demonstrating their new J-6, 325 horsepower motors. Taking off from the Grand Central Air Terminal, within thirty minutes we landed at the private landing field of the Narconian Club, high up among the foothills of Riverside County. A beautiful spot, with one of the finest hotel club-houses in the country. A perfect take-off, and we started the return trip over the mountains, passing over Big Bear Lake, Arrowhead Lake, and through and above the Waterman Canyon, at an altitude of over 10,000 feet. A wonderful sight, and the three J-6s purring, made a trip that we will remember for a long time.

WHILE I was at the Los Angeles Metropolitan Airport lately, Wm. Brock of Brock and Schlee, nationally known airplane distributors, was just taking off in one of the latest Bach trimotored transports for Detroit, Mich. With him, among others, was B. L. Graves, president of the Bach Aircraft. The outcome of the trip was a

contract between the Bach Aircraft and Brock and Schlee involving a total price of \$1,400,000 on an order for thirty-five ten-place three-engined transports. Ten are to be delivered within a period of ten months. This with other orders on file, necessitates the enlargement of the plant at Metropolitan Field, and a speeding up of production to six ten-place transports a month.

EMPLOYEES of the Richfield Oil Company have organized an Aero Club, under the title of the Richfield Aero Club. This is probably the largest Aero Club ever formed by the employees of a single corporation, having 175 members. The club has already organized three flight units, of twenty-five members each. Weekly meetings are held at Long Beach, where lectures on aviation subjects are delivered by some of the leaders of the industry. Ground school and flying instruction is provided the members. George E. Irvine, chief engineer of the company's Aviation department is director of the ground school, and Ralph W. Horn is technical advisor for the flight units.

THE California Aerial Transport, operating the California University of Aeronautics, Los Angeles, has moved to the Los Angeles Municipal Airport at Eaglewood, where they have offices and a large hangar. Students of the University have all the advantages of the course formerly offered by the California Aerial Transport, plus the additional advantages of being able to fly from one of the largest and best equipped airports in the United States, under a corps of able instructors.

WHILE at Clover Field, Santa Monica, we had an opportunity to see the test-flight of a new Barling, NB-3, flown by the factory test pilot, Barney Zimmerly, holder of the light plane distance, and the American light-plane altitude records. What a test he gave the little ship! It seemed as though he was trying to break it in pieces, putting it through every known stunt. An army or navy pursuit plane could not have done more. It took off in a short distance, and landed as slowly, as any plane I have ever seen land. Jess Warren has the agency for this little plane, for the entire West Coast.

## PACIFIC COAST GLIDER MEET AT SAN DIEGO

THE Pacific Coast Glider Meet is to be held September 1 and 2 at Pacific Beach, San Diego, under the auspices of the Pacific Beach Business Men's Association and the San Diego Glider Club. It is sanctioned by the San Diego Chapter of the National Aeronautic Association and is supervised by the San Diego Board of Air Control. The Aviation Committee of the San Diego Chamber of Commerce is assisting in arranging and handling the program. Prizes will be given for four events.

Glider will be divided into three classes, primary training gliders, secondary training gliders, and soarers, after their arrival in San Diego, by the contest committee. Each

event will be open to gliders of all classes, the classifications being made for the purpose of claiming American records in each class, should excellent flights be made. Gliders will be inspected before taking part by the San Diego Board of Air Control. This Board has supervision over all aviation activities in the city of San Diego and is empowered with police authority to enforce the air regulations. Gliders will be inspected for structural defects and pilots for knowledge of air laws and ability. All launchings will be from the side of a hill. Shock-cords only will be used for launchings.

## CALIFORNIA

THE California Aircraft Operators' Association has been reorganized under the head of the California Aircraft Industries Association, and its by-laws have been revised to include all companies and firms whose activities are in commercial aviation.

The original association was formed by California operators who felt the need of banding together to solve problems, and to do what they could to put the right kind of legislation in the State of California. It drafted and sponsored the Evans Bill in the last session of the State Legislature successfully. A general meeting of the Association was held August 15.

PLANES operated between Los Angeles and Kansas City by Western Air Express, carried more than 50 per cent of their capacity during the month of July, and were on time, or ahead of schedule, 90 per cent of the time, according to a statement by C. W. H. Smith, general traffic manager of the operating company.

During the month, 393 passengers were carried, 40 per cent of them using the Western Air Express air-rail system to leading cities in the middle west and east. In June, 371 persons were carried over this route. Up to August 1, Western Air Express had carried in the first six months of this year a total of 11,338 persons, as against 6,794 for the entire year of 1928. This year's total will reach nearly 20,000.

THE Richfield Oil Company of California has circularized a booklet on the National Air Races to be held in Cleveland, August 24, to September 2. The pamphlet includes a map of the city of Cleveland, showing the location of the Cleveland Municipal Airport in relation thereto. The principal suburbs and main highways are indicated in detail. In the upper left hand corner is a photograph of the airport, and the location of the military and civilian parking areas can be identified. On the reverse side of the map the air traffic regulations are given.

A BILL which requires the scrapping of all antiquated and unlicensed airplanes in California as an aid to safe flying was signed recently by Governor C. C. Young. It is estimated that nearly 350 of the 550 ships being operated in the state will be affected by the measure.

(Continued on next page)



# *FOKKER lends Seven League Boots to Chicago . . . .*

Into Chicago, traveler's mecca, hub of transportation, at the cross-roads of a continent, came Universal Air Lines, to speed four-fold the pulse of travel, to do in one fleeting hour the work of four. Universal air liners must maintain "on time service" at Chicago, at Cleveland, at Louisville, at Omaha, at St. Louis, at Kansas City, at Dallas, at Garden City / Universal passengers use the airways to save days in cross-continent travel / Universal air liners must "make connections."

To maintain this unexcelled standard of service and travel luxury, Universal Air Lines exhaustively tested all available air transport equipment. Then, with the entire market from which to choose, Universal equipped its air lines with super-tri-motor Fokker air liners, the finest in speed, comfort and dependability that money can buy.

Other outstanding air lines, renowned for "on-time service," likewise use Fokker equipment, among them Texas Air Transport; Standard Air Lines; National Parks Airways; Dominion Airways; Pan-American Airways; Western Air Express.

*Write your name and address in the margin below, send it to the Fokker Travel Bureau, 655 Chamber of Commerce Building, Los Angeles, California, with a five-cent stamp (to pay air mail postage) and let us send you our illustrated booklet, "When Air Travel Pays."*

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Name.....AD



(California News continued)

Passage of the new law is expected to assist the state in maintaining its activity in the air. Aeronautical experts regard it as an insurance policy for air passengers, in view of the fact that it specifically provides for the grounding of all unlicensed ships. Rules prohibiting stunting, providing for the inspection of aircraft and pilots, and prescribing the minimum height at which airplanes may fly, are included in the new legislation.

THE chamber of commerce and the real estate board of Compton, California, propose, through a bond issue, to purchase approximately 300 acres of land for a municipal airport.

GLOVER RUCKSTELL has leased a hangar at the Los Angeles Metropolitan Airport. He will install machinery and a laboratory for research and development of aircraft engines, as well as the distribution of several planes.

H. E. CASSIDY, who recently returned from Europe after spending 6 months in research and study, has been appointed director of sales research and publicity by the Axelson Aircraft Engine Company of Los Angeles. In his new capacity he will be in charge of public relations.

AIRCRAFT INDUSTRIES, INC., of San Leandro, Calif., has developed an illuminated wind vane using neon light tubes. The vane is modeled after an airplane, the T being mounted on top of the fuselage and wings. The device is being used by Oakland, San Francisco, and Bakersfield airports.

#### Boeing Field at Burbank Under Construction

CONSTRUCTION of the new \$1,500,000 airport for the Boeing Air Transport at Burbank, Calif., was started recently. According to W. L. Campbell, Boeing representative, the flying field will be ready for operation within ninety days, although the construction program will take six months.

The new airport will comprise 240 acres.

Plans for the airport call for immediate erection of three hangars and an administration building. Each of the hangars will be 150 by 200 feet, of steel and brick construction with steel sash sidewalls.

Approximately three hundred men will be employed in the construction of the 240-acre airport. Two tractors, two electric graders and 210 mules are being used on the field for the grading work.

The terminal building will be 90 by 130 feet, with two stories and basement, and with a control tower. Administration offices, ticket offices, dining rooms, kitchen, fountain and grill, waiting-room and telegraph office will comprise the first floor. There will also be a covered terrace and a canopy entrance to the ships. On the pergola will be an open air cafe, where people can have their lunch and watch the activities of the flying field with an unobstructed view.

#### Mills Field May Be Purchased by City of San Francisco

PROBABILITY that the City of San Francisco may purchase Mills Field, the chief airport of the city, is seen in a recommendation by the airport committee of the Board of Supervisors, that a bond issue of \$2,000,000 be submitted to the voters. The airport has just completed its second year, and is said to be doing a capacity business. It was opened in May 1927, and since that time 50,322 landings, with 85,002 passengers have been reported in the port's log book.

### ALAMEDA

[HOWARD V. WALDORF]

AIRPORT development programs calling for investments totalling \$3,000,000 are under way in Alameda. Filling of 266 acres as the first unit of a \$2,000,000 development program is being rushed at Alameda Airport, Inc., unit of the Curtiss Airports Corporation chain. The plans announced by western executives of the Curtiss organization call for the establishment of a \$250,000 seaplane base and yacht harbor on the western edge of the flying field. Improvements for the flying field include cross concrete runways, each 4000 feet in length, and

the construction of a line of hangars. The filling contract, which will treble the landing area of the flying field, is being carried out in conjunction with the federal dredging work in Oakland harbor.

Grading of a 256-acre area on the western Alameda waterfront, on which the San Francisco Bay Airdrome, Inc., plans to spend \$1,000,000 to develop it into an air terminal is under way. An air depot and concrete runways are included in the plans.

Between the two flying fields is a 311-acre tract which has been offered by the City of Alameda as a site for the proposed \$5,000,000 Pacific Coast army air base. Acceptance of this offer would give Alameda a combined flying field of approximately 1000 acres, and offering an unobstructed runway nearly four miles long.

JERRY ANDREWS, former Alameda airport flying instructor, has accepted the post of chief pilot for the West Coast Airways, operating an air transport service between Central California cities. Travel Air cabin monoplanes are used.

FOR the benefit of tourists, the Maddux Air Lines has established week end service between Alameda airport and Lake Tahoe in the high Sierras. The Brockway airport, which has a mile long runway, is used as the eastern terminal of the service. Eastbound flights are made Saturday afternoons, with the return flights, scheduled for Monday mornings.

AS AERO DIGEST goes to press the plate of the accompanying photograph of the first Hodkinson Transport, completed and test flown on August 15, is received by air-mail from Hodkinson Aircraft, of Glendale, Calif., makers of the ship. The plate was developed, packed wet, and was on the press in New York City three days after the plane was completed. By previous arrangement, it is included in this issue. The Hodkinson Transport No. 1 is an 8-place cabin sesquiplane, powered by three Curtiss Challenger engines of 170 horsepower each. Two engines are mounted on the short sesquiwings. This plane is being flown to Cleveland to be shown at the National Air Races.



The Hodkinson trimotored sesquiplane, a light passenger transport recently completed at Glendale, California



# The U.S. Government Has Awarded It's HIGHEST RATING to the RYAN



*Flying School  
at San Diego*

Aerial view of  
San Diego  
California  
showing one of the  
RYAN Cabin  
Broughams  
used for  
advanced training!

*Note:* All training at the T. C. Ryan Flying School is given under the personal supervision of T. Claude Ryan, original designer and builder of Ryan monoplanes and founder of Ryan Airlines, Ryan Flying Company, T. C. Ryan Flying School and T. C. Ryan Aeronautical Corporation.

FOR years, T. Claude Ryan has been snapping his aeronautical courses not to meet *minimum* requirements but rather to prepare thoroughly for *maximum* demands of the industry. For example, the RYAN ground school courses give 355 hours of instruction within 4 months. In recognition of this condition the United States Government has approved the Ryan System of Training for *advanced* as well as *primary* training—thus enabling RYAN graduates to apply, without additional training or time in the air, for Transport Pilot's licenses, as well as Commercial Pilot's and Private Pilot's licenses. This is the highest governmental recognition that can be conferred upon any school and its graduates.

Other schools, undoubtedly, will receive similar ratings—but the RYAN school will continue to maintain its leadership by presenting a type of training that is not available elsewhere.

Nowhere, except in San Diego and immediate vicinity, for example, can cross-country flight ex-

perience be obtained over desert, mountains and ocean. Nowhere else are flying conditions so varied and so ideal, permitting the greatest amount of training in the shortest possible time.

In no other city in the world is there such variety of year 'round flying activity, military, private and commercial, from which to gain inspiration, experience and broad knowledge thru intimate contact and observation.

RYAN reputation is world wide. *It means something to be a Ryan graduate!* Advanced RYAN training is given in 6 different types of licensed biplanes and monoplanes, large and small, open and closed.

RYAN Airport is the hub of 2 great transportation systems, dispatching 12 tri-motor planes, and numerous other commercial craft, daily! Students establish valuable aeronautical contacts at this popular, busy field. It's delightful over the cool blue waters of San Diego Bay in the summer time. Classes now forming.

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This school invites the attention of those who are interested only in the highest standards of aeronautical training. RYAN TRAINING costs more than ordinary training. . . . It is worth it! Courses include:

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Where Quality  
Training  
is Supreme!





Drawing of the Axelson Aircraft Engine Co. plant to be built at Los Angeles

## OAKLAND

[HOWARD V. WALDORF]

**A**T the Aircraft Industries plant, Oakland, Calif., a Swallow biplane is being prepared for the testing of a new two parachute method of lowering a plane to earth in the event of the necessity of a forced landing. The method calls for the installation of two 60-foot parachutes in cases built into the structure of the upper wing, above the outer strut connections. The parachutes are to be connected to the plane by means of a cable fastened onto the wing spars. Zippers, operated from the cockpit by wire controls, are to cut the fabric and release the parachutes. Installation of the parachutes on the widely separated points of the upper wing eliminates the danger of fouling the tail surfaces and prevents the craft from spinning, it is claimed.

**A** PARACHUTE club has been formed at Oakland Municipal Airport. To qualify for membership, a pilot must make a jump in the presence of the officers of the club. Walter Hall is president, and Harry L. Blunt is vice president.

**E**ARL WEISIGER, field manager of the Western Air Express at Oakland Municipal airport, has been promoted to assistant superintendent of operations for the concern. George D. Clarke, chief mechanic, is acting field manager pending an official appointment.

**O**N the first emergency patrol of the summer, Harry L. Blunt, forest patrol flier of Oakland Municipal Airport was credited with saving the Klamath National Forest in northern California from destruction. The aerial unit was called out when fire had swept over 2,000 acres of the forest and the remainder appeared to be doomed. Observation work of the aerial unit resulted in the adoption of a new plan of battle which brought the fire under control without further damage to the forest.

**A** NEW type passenger gangway is included in the plans for hangar 5, Boeing Air Transport base, now nearing completion at Oakland Municipal Airport. When the structure is completed passengers for the Boeing planes will be received in the ticket office on the second floor of an office building adjoining the hangar. From the ticket office, they will go through a glass

covered runway extending under the roof and over the top of the planes, to a glass covered observation and waiting room, overlooking the flying field. A flight of steps will connect this room with a canvas covered canopy leading to the planes. The air mail office is to be located underneath the waiting room.

**H**ORACE R. BYERS has resigned as junior meteorologist at Oakland Municipal Airport in order to accept a teaching fellowship in the Guggenheim Foundation at the Massachusetts Institute of Technology. Mr. Byers was formerly an executive of the Guggenheim Fund model airway staff.

**T**HE West America Air Schools, Ltd., has been added to the ranks of commercial flying services at Oakland Municipal Airport. The organization, which recently filed papers of incorporation, holds the agency for Waco planes and Mono Aircraft.

**D**ONALD MCCLURE of Oakland has been elected president of the Western Aviation, Inc., airplane supply organization, which is now in the midst of a \$6,000,000 expansion program. Mr. McClure, who was formerly secretary, replaces C. Zook Sutton.

**Q**UANTITY production of the Sierra, Comet-powered cabin monoplane, is to be inaugurated in a factory now under construction in Modesto, according to announcement by officials of the Aircraft Industries, manufacturers of the craft. The factory, now located at San Leandro, near the Oakland Municipal Airport, is to be used as a repair shop.

Decision to move the factory to Modesto, which is located in the San Joaquin valley of California, followed the election to the board of directors of three Modesto business leaders, and the formation of a \$500,000 company, the Sierra Aircraft Industries, to produce the plane. Ultimate production is to be 35 planes a month, with an initial output of four a month, according to plans made public.

**T**HE Oakland Airport Inn is now in operation, under the management of Harry E. Brown of the Interstate Company. Erected at a cost of approximately \$55,000, this 37-room hostelry is one of the first exclusive hotel buildings to be erected at any American airport. The hotel was built by the Oakland Board of Port Commis-

sioners and is leased from the city by the Interstate Company. The building is connected to the airport restaurant by a passageway. The restaurant can accommodate 185 persons. In addition to the pilots and mechanics who make the hotel their living quarters, a sufficient number of rooms is kept in reserve for transient guests.

**E**D GREER, of Oakland Municipal Airport, has resigned as reserve air mail pilot of the Boeing Air Transport in order to do a year's active duty with the naval air forces. Greer holds the rank of ensign.

## CENTRAL CALIFORNIA

[RUSSELL GRIGSBY]

**T**HE Western Coast Airways have started a passenger line between Sacramento, Stockton, Modesto, and Fresno. They make one round trip daily, except Sundays, with a 6-place Whirlwind Travel Air cabin monoplane.

**N**EGOTIATIONS have been completed, and government approval obtained, for the transfer of the Livermore, Calif., airport, to the Richfield Oil Company. The transfer was made effective August 1, and was arranged through the Livermore Chamber of Commerce, of which R. A. Hansen, is president. There are 2 hangars, 4 planes, 2 beacons, border lights, obstruction lights, gas oil, water, and telephone at the Livermore field. It is located in the northwest edge of the town.

**T**HE Kern County Municipal Airport is located 5 miles north of Bakersfield, Calif., on a broad plain. It is completely equipped, and the Maddux Air Lines, Pacific Air Transport, and Transcontinental Air Transport make it a regular stopping place.

**T**HE McCoomb Dirigible Corp., of San Francisco, are to start a factory soon on the site now owned by the Pacific Shipbuilding Co., 6 miles west of Pittsburg, Calif. The McCoomb firm holds patents for a new type dirigible.

**T**HE Sacramento City Council has approved a plan to purchase the 232 acre Sugget ranch, on the Freeport road southwest of town, for an airport. The site will cost \$80,000, and is 20 minutes from the business district of Sacramento, on the Sacramento River.

**T**HE board of directors of the Yuba City, Calif., chapter of the N.A.A., has invited a representative of the Department of Commerce to inspect the Dr. Jackson property, along the Feather River, for a proposed airport. Planes have used this field several years.

**B**IDWELL FIELD, municipal airport of Red Bluff, Calif., is being improved with a caretaker's cottage, office, 3-plane hangar, well, and graded runways. An illuminated sign, with the name "Red Bluff," and an arrow pointing toward the field, has been installed on the roof of the State Theater building.

# WHY

...has more development taken place at the Los Angeles Metropolitan Airport than at any other Airport in the United States during the past six months?

# BECAUSE

...it fulfills absolutely every requirement of a modern airport and offers aircraft MANUFACTURERS the IDEAL FACTORY SITE in the very heart of the "air capital of the West"... San Fernando Valley.

**T**HE PAST SIX MONTHS have brought these developments to the Los Angeles Metropolitan Airport:

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## ARIZONA

[HAROLD G. WILSON]

**R.** L. ANDRICK, San Antonio, has been named staff sergeant for the municipal airport at Tucson, a control point on the U. S. Model Army Airway, succeeding Dewey Simpson, who resigned to become field operator for the Standard Airline field at El Paso.

**F**OUR thousand dollars will be expended on the International Airport at Douglas during the coming year, by Cochise county, this amount being included in the year's budget. A like amount will be spent on the Bisbee field and \$1,000 was set aside for an air field to be established near Willcox.

**T**HE Copper State Airways, which operates from the Prescott and Verde airports, will serve as a feeder line for the Western Air Express cross-country line, making connections at Winslow. Three of the graduates of the Copper States air school recently gave an exhibition of their work. The soloists are Herman B. Winter, Clarence A. Stukey and Alex Spence.

**A**NNOUNCEMENT of a \$200,000 ground school of aeronautics to open in the fall has been made by Air Investors, financial backers of Scenic Airways, Inc. This company now operates from 17 airports, and has an investment of approximately \$1,000,000, in the state. Formal dedication of the Phoenix Sky Harbor, which is used by

Standard Airlines as their stopping point in Phoenix, is planned for Labor Day.

A lease on the Nogales airport has been granted Scenic Airways by the board of supervisors of Santa Cruz county. The company plans to operate a branch of its aeronautical school there and to keep a plane at the field for general taxi work.

**P**LANs are being prepared for the first wing of an administration building for the Tucson municipal airport. A concrete apron is to be constructed, and other smaller improvements made with the \$25,000 recently voted by bond issue.

## NEW MEXICO

[TED MAGEE]

**A** CLUB house and dining room building of pueblo style architecture is being constructed at the Albuquerque airport and will soon be finished. This building will be open to all visitors at the airport.

**W**ORK on the Western Air Express landing field at Albuquerque has been retarded considerably by heavy sands which officials have been trying to harden by the use of soil combinations found in the vicinity. When completed, the field will have seven runways, each nearly 3,000 feet long.

**W**HEN railroad and bus lines were stopped for two days because of cloudbursts in Arizona, Winslow and Holbrook would have been marooned if they had not been on the

T. A. T. and Western Air Express routes. Passenger traffic from those two places, and from Kingman and Albuquerque, was increased during the flood period.

**A**IRPLANE express service was commenced on August 6 over the lines of the Western Air Express. An agreement between the air company and the railway express agencies makes 12-hour service possible between Kansas City and Los Angeles. Rates are seventy five cents to any point, and two hundred pounds is the weight limit. Stops are made at Holbrook, Kingman, Amarillo and Wichita. The Arizona towns will be passed by on the daily flights unless express or passengers are leaving the ship.

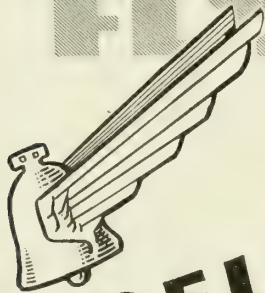
**W**ESTERN AIR EXPRESS has offered to build and equip an airport in Santa Fe, the state capital, if that city will furnish the land. P. H. Philbin, company official, announced recently. Daily transport service between Albuquerque and Santa Fe would be provided.

## NEVADA

[GLEN PERRINS]

**E**LY'S airport will be inspected for the possibilities of making it one of the ports on an air passenger line now being organized to operate between San Francisco and Denver, it is reported. The route from Reno to Salt Lake via Ely is said to be shorter than via Elko.

# LEARN TO FLY



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ing materials supplied from the extensive stocks of the California Panel and Veneer Company—Shock Cords, Aero Rings, Strip Steel, Chrome Molybdenum Tubing, Safety Belts, Grade A Fabric, Nickel Steel Bolts, Brass Nails and Plywood.

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COLD ROLLED  
STRIP STEEL**

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Los Angeles



## NORTHWEST

[F. H. HASKELL]

THE first airplane made in Eugene, Ore., made its maiden flight recently. The plane is the product of the Lion Aircraft Company. The ship made a perfect take-off, and it is expected that several other ships of the same make will be built during the remainder of the year.

A REGULAR army aviation base, working under the direction of the agricultural department, will be established on Felts Field, Spokane, Wash., for the purpose of making aerial photographs of neighboring national parks. Lieut. Edwin P. Bobzein, and staff Sergt. Edward Bush are in charge of a crew of ten men and three truck loads of equipment. All photographs are finished on the field.

THE hard sand beach at Tillamook, Ore., was the scene of an air derby August 3rd and 4th. Salem, Ore., dedicated its air field on August 8th.

BEACON lights for air mail night flying are now being erected between Delta, Calif., and Drain, Ore. The government will install electric beacons on the summit of the Siskiyou, instead of the gas beacons as was originally intended.

Columbia Gorge from a point slightly east of The Dalles to Portland is to be double-lighted airway lane, according to Robert Lund representative for Varney Air

Lines. A row of lights will be installed on each side of the famous gorge. These lights will be thirty miles apart.

AIR service between Wenatchee and Yakima has been inaugurated by the Interstate Air Lines. Two round trips are being made daily.

AN attempt to break the regular Army Air Corps long range photographic record of 175 miles is being made over Spokane at altitudes of 18,000 feet by Major C. V. Haynes and Lieut. Hilford R. Wallace. Mount Rainier 210 miles away, is the camera's objective.

A FINAL step toward establishment of a school of aeronautics at the University of Washington was recently taken in the appointment of Prof. E. O. Eastwood as acting director of the Guggenheim laboratories of mechanical engineering.

THE Gorst Air Transport Company has placed its second eight-passenger plane in the Seattle-Bremerton ferry service. The run is now being made between terminals in nine minutes.

IMPROVEMENTS to be made on the municipal airport at Gore Hill, Great Falls, Mont., include \$6,000 to be spent during the coming month. \$3,500 will be spent for lighting the east, north and south sides of the field, and \$1,500 will be spent grading a north and south runway.

A TOTAL of \$10,000 will be spent at Kennewick, Washington, on the local air field, which will be improved by the construction of hangars, purchase of supplies, and further improvement of the grounds. The airport is owned by the city.

BOEING officials announce that pilots of the Pacific Air Transport company are now able to communicate by radio from their planes with ground stations on the route from Seattle to Los Angeles. Stations on the coast route will be at Seattle, and Tacoma, Wash. and at Los Angeles, Bakersfield, Fresno, Oakland and Redding, Cal.

TWO large hangars, and an adjoining administration building, calling for an expenditure of \$74,000 will be constructed at the Swan Island airport at Portland, Ore.

## WASHINGTON

[C. M. LITTLEJOHN]

THE possible use of airplanes in the pollination of seed alfalfa fields was indicated recently by experiments conducted on the field of Gay Larkin on the Ochoco tract at Prineville, Ore.

It was found by flying a plane low over the field that the operation had resulted in an increase of pollenization 30 per cent. Further experiments with a sand blast operated from a plane are expected to greatly increase the opening of the pollen tubes.

(Continued on next page)

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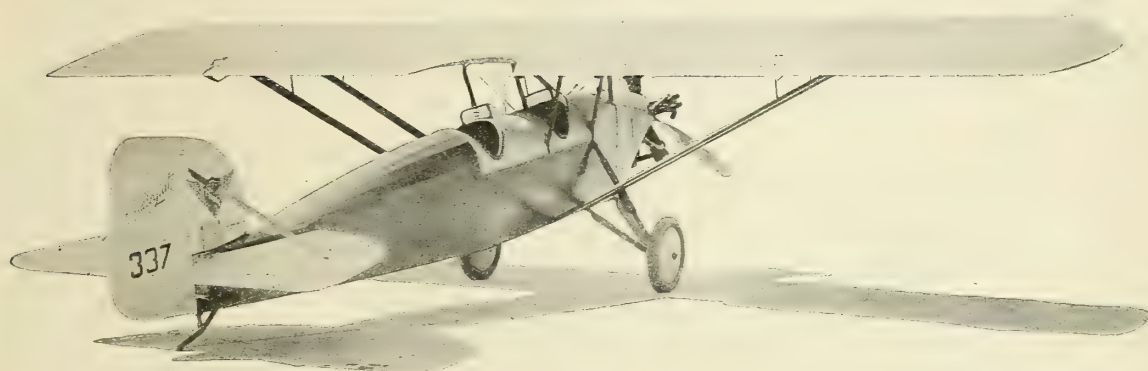
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(Washington News continued)

**B**USINESS and civic leaders of Vancouver, Wash., are planning extensive development of their airport. At present the field is leased on a yearly basis, but the city is seeking a ten-year lease from the Spokane, Portland and Seattle Railroad, which owns the property, in order to develop the port fully.

**T**HE University of Washington, at which the department of aeronautics is headed by Prof. F. B. Farquharson, has been selected by the Aeronautical Chamber of Commerce as one of the few universities of the country to test commercial airplanes in accordance with a new procedure. The new code is expected to provide manufacturers of planes with a standard basis on which to compute the speed, rate of climb, ceiling, landing speed and other performance statistics of airplanes.

**T**HE Bellingham Chamber of Commerce and civic leaders of Bellingham are endeavoring to have the Graham Airport of that city designated as the official airport of entry for planes entering the United States in that region from Canada.

**A** SUBSIDIARY company is being organized to care exclusively for the expanding business of foreign countries of the Boeing Airplane Company at Seattle. Francis H. Love will head the new subsidiary organization. The foreign orders for the first seven months of the year for the Boeing

and the United Aircraft organizations amounted to more than two million dollars.

**H**ARRY HUKING of the Boeing lines has been made president of the National Pilots' Association. Mr. Huking is piloting a Boeing tri-motored twelve-passenger transport on the night ride from San Francisco to Salt Lake City.

**B**OEING System officials have authorized an appropriation which calls for immediate construction of additional ground radiophone stations, so that by September 15, pilots on the Chicago-San Francisco run will have radiophone communication the entire distance between Chicago and San Francisco.

The fourteen ground stations will be located at: Oakland, Sacramento, Reno and Elko, Nev.; Salt Lake City, Utah; Rock Springs and Cheyenne, Wyo.; North Platte, Omaha and Lincoln, Neb.; Des Moines, Iowa City and Cedar Rapids, Iowa; and Chicago municipal airport.

**A**NNOUNCEMENT was made recently of the following appointments to the Boeing School of Aeronautics, which will open September 15, at Hangar 5, Oakland Airport: general manager, T. Lee; dean, H. F. Lusk; and chief of flying service, George Meyers. All are college graduates and had Army experience prior to becoming engaged in commercial operations. The Boeing School of Aeronautics is to be housed in a special hangar erected by the Oakland Airport Com-

missioners. The school offers these courses: private pilot; limited commercial; transport pilot; special master pilot flying; master pilot ground school; and master mechanic. It has recently added an airplane and mechanics' course consisting of 140 hours of lecture, laboratory and shop instructions.

**T**HE Boeing Airplane Company of Seattle has just moved into new quarters, a factory-administration building designed to meet the needs of the Boeing personnel. The modern brick building was erected at a cost of \$200,000, and there is 55,000 square feet of floor space in its three stories. Boeing Air Transport and Pacific Air Transport have also moved their offices to the new building.

## CANAL ZONE

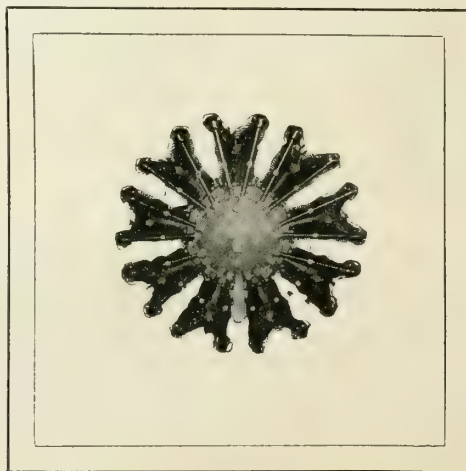
[J. F. H.]

**I**T was announced by the Panama postoffice officials that a gross profit of \$4,000 had been made on the sale of air mail stamps from May until July 1, and that every indication points to a much larger profit within the next three months as the merchants and civilian population realize the increased speed of delivery of air mail letters in the United States and Central America.

**T**HE Panama government has decided to buy a tract of land at David, a regular stop on the Canal Zone-United States air line, to be converted into a national airport. Appropriations have been made for the construction of hangars and the clearing of the field. (Continued on next page)

## PRATT & WHITNEY SERVICE . . . .

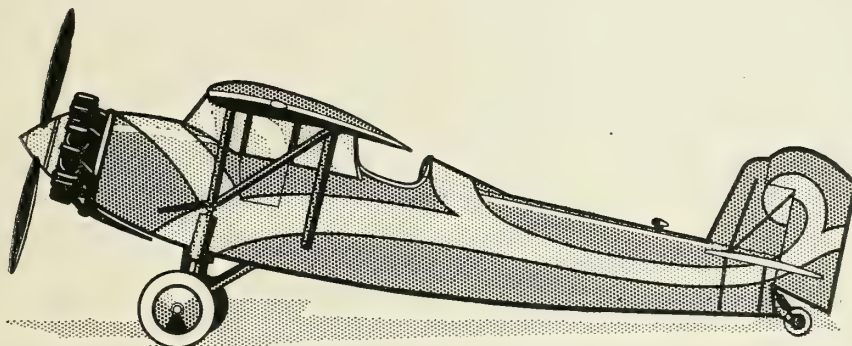
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**MODEL M-1 3-Place**

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 Rate of climb, 1,100 ft.  
 Fuel capacity, 70 gals.  
 Cruising range, 600-650 miles.  
 Useful load, 1,020 lbs.  
 Weight (empty), 1,780 lbs.  
 Wright 220 H.P. engine.  
 All wood wing.  
 Wing span, 39'; Length, 28' 6".  
 Available cargo space, 44 feet 5 cubic inches including baggage compartment in fuselage.  
 Fuselage, welded chrome molybdenum steel tubing.  
 Adjustable horizontal stabilizer.  
 Complete set of 12 instruments.  
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*On Exhibit Nat. Aeronautical Show,  
 Cleveland, Ohio*

Bendix toe brakes.  
 Adjustable pilot seat.  
 Fabrikoid lining and upholstery.  
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 Cabin has desk with filing cabinet, lights, ash-tray, cigar-lighter and heater.  
 Non-shatterable plate-glass windows.  
 Cabin opens to pilot cockpit, which is open, yet so arranged pilot can fly without goggles and with full visibility.  
 Performance equal to any ship of equal horsepower.  
 Fine workmanship gives minimum upkeep with Maximum service.  
 Price, f.a.f. Los Angeles Municipal Airport, Inglewood, Calif.—\$10,750.00.

**MORELAND AIRCRAFT, Inc.**  
 Los Angeles Municipal Airport, Inglewood, Calif.



(Canal Zone News continued)

THE Isthmian Airways, Inc., has purchased a Travel Air biplane, equipped with pontoons and a Wright Wirlwind engine, to be used as a training plane. Preliminary training will be given in this plane and the advanced course in the larger Hamilton monoplanes which the company employs on its trans-Canal service.

THE Panamanian government has named a committee to add to the regulations now in force for the establishment of aviation schools and the licensing of pilots in Panama. It will also add to the commercial regulations now in force.

L. T. COMMANDER FRANK MAILE, U. S. N., who has been commanding the U. S. Naval Air Station at Coco Solo for the past two and a half years, recently left for a new post aboard the airplane carrier *Lexington*. During his stay in Panama Commander Maile furthered the cause of commercial aviation, and loaned his forces whenever possible to further any branch of aeronautics.

Colonel James A. Mars, U. S. A., new commanding officer at France Field, the army flying post in the Canal Zone, has been named as Department Air Officer on the staff of the U. S. Army's Panama Canal Department.

FROM May 1 to August 1 more than 470 ocean to ocean flights were made, and nearly 40,000 pounds of baggage were carried on the Isthmian Airways tri-daily service across the Panama Canal. The two Hamilton planes employed by the company have also been used in sightseeing service for tourists.

A BI-WEEKLY mail, passenger and freight service between the Canal Zone and Colombian cities will soon be started by the Scadta company, which is now operating in and out of the Zone once a week.

THE Pan American Airways has suspended its tri-daily service across the Canal, and makes only one trip a day. The Ford tri-motored plane leaves the Atlantic side at 10 o'clock in the morning and lands at the Panama Municipal airport at 10:30, remaining until 3 in the afternoon. This

service allows business men and tourists ample time to transact business, or shop in Panama.

IN conjunction with several other construction developments on its transportation facilities, the central government of Panama plans to expend \$5,000,000 on the Albuca flying field and \$2,000,000 on France Field, according to a recent report from Panama City.

THE Army fliers at France Field have carried eighteen injured and sick Panamanians from the interior of the Republic of Panama to Canal Zone hospitals within the past sixteen months, according to figures just released at the field.

THOUGH the air mail has been carried by the Pan American-Grace Airways from Cristobal to Guayaquil, Ecuador, no passengers have yet been carried, but it has been stated the service for passengers will soon be inaugurated, since the company has arranged facilities for handling passengers at the overnight stops.

## HAWAII

[VERNE HINKLEY]

CHARLES ELLIOTT, veteran of the naval air service and pilot with more than 2,700 hours to his credit, has arrived in Hawaii to join the Inter-Island Airways, Ltd., which will open a commercial line in Hawaii in the early fall, using twin-engined Sikorskys. Elliott was formerly stationed at the Pearl Harbor air station for five years.

COL. JOHN H. HOWARD, air officer for the Hawaiian department for three years, sailed July 30 en route to Mitchel Field, N. Y. Colonel Howard's successor, Col. H. C. Pratt arrived August 20. During the interval Major C. H. Wash, commanding at Wheeler Field, was acting air officer.

SEVEN naval aviators have arrived for duty at the Pearl Harbor air station. They are Lieutenants M. A. Schur, H. H. Hassleman, L. L. Hunt, T. B. Williamson, P. E. Treadwell, H. E. Morgan and L. K. Price. Army pilots ordered here in the near future are as follows: Lieut. J. W. Benson, of Scott Field; Lieut. J. L. Loutzenheiser,

of Chanute Field; Lieut. E. R. Todd, of Pope Field; Lieut. J. H. Dulligan, of March Field, and Lieut. E. T. Noyes, of March Field.

AN aerial survey for the assistance of the agricultural department of the University of Hawaii has been made with the assistance of the army Fokker, *Bird of Paradise*. Flights were made over the islands of Kauai, Hawaii, Maui, Molokai, Lanai and Kahoolawe. President David L. Crawford, of the university, and members of the agricultural staff were passengers.

A WESTERN Pacific Air Transport plane from the Ward airport recently flew over Honolulu advertising an automobile by means of a large electric sign on the lower wing. The ship used was an OX-5 Travel Air, piloted by Capt. James L. Giffin. The company has accepted a contract from a Honolulu afternoon newspaper to deliver more than 600 copies of the publication to the island of Maui, 120 miles away, each Saturday afternoon.

A NEW hangar, that of the Inter-Island Airways, Ltd., is to be started at the John Rodgers airport, Honolulu's municipal field, in a short time. The structure will be sufficiently large to house four planes.

Another commercial air company, Hawaiian Airways, Ltd., will start service early in the fall with tri-motor Fokker F-10s. It will use John Rodgers Field as a base.

THIS next fiscal year, which started July 1, will be a busy one for the Hawaiian department of the Army and especially for Wheeler Field, the home of the air service of the Hawaiian division, stationed at Schofield Barracks. Very nearly \$3,000,000 worth of building projects are to be begun by the Army during the 12 months and of this amount more than \$2,000,000 will be applied to the flying field.

Items included in the program, a part of the five-year scheme, are as follows:

Enlargement of Wheeler Field, \$110,000; six hangars, \$240,000; barracks, \$504,000; officers' quarters, \$666,000; non-commissioned officers' quarters, \$300,000; headquarters and operations building, \$40,000; machine shop, \$81,000; gasoline and oil storage and re-

(Continued on next page)

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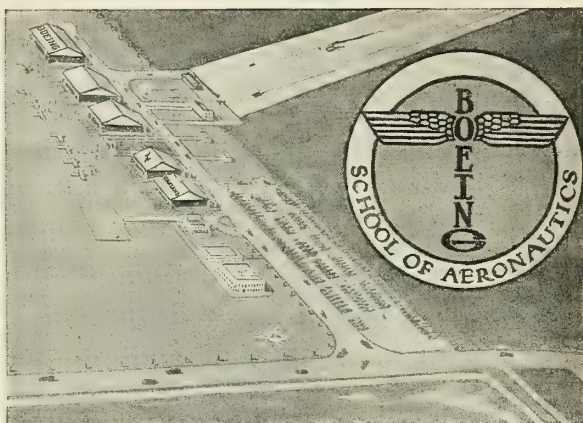
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HAL SMITH, Dept. Mgr.

# BOEING SCHOOL of AERONAUTICS opens this month at Oakland



Famous Oakland, California, Airport, campus of Boeing School of Aeronautics, new University of the Air. CLASSES OPEN SEPT. 16. Ideal year-round flying conditions

IT is now possible for you to enroll in an outstanding flying school associated with the largest airplane factory and largest air transport system in the United States.

Learn to fly at a school whose courses not only meet, but exceed the new and more rigid Department of Commerce regulations. The Boeing School of Aeronautics sets the same high standard at its school as the Boeing Airplane Company has established in building planes, and the Boeing System in flying 6,000,000 miles on the transcontinental and Pacific Coast air mail, express and passenger routes.

On one of the world's largest and best airports, hub of air transport activities in the West, with a splendid new building, close to metropolitan cities, and with a mild climate permitting uninterrupted year-round flying instruction, Boeing School of Aeronautics also has advantages of unusual location.

Investigate various schools. Check the courses. Measure your tuition against what you get in return. Weigh the experience, reputation and resources back of schools. Find out which school's diploma will be your best endorsement when you seek a connection after graduation.

Get complete detailed information on the Boeing courses you are interested in. Write or send the coupon.

## BOEING SCHOOL of AERONAUTICS

Division of United Aircraft and Transport Corporation  
Airport - Oakland - California

### Coupon for Information

BOEING SCHOOL of AERONAUTICS, BSA-4, Airport, Oakland, California  
I am interested in the Boeing School of Aeronautics course I have checked:

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| <input type="checkbox"/> Private Pilot<br>25 hrs. ground school. In air, 10 hrs. dual, 8 solo. | <input type="checkbox"/> Limited Commercial<br>51 hrs. ground school. In air, 15 hours dual, 35 solo. | <input type="checkbox"/> Transport Pilot<br>100 hrs. ground school. In air, 50 hours dual, 150 solo. |
| <input type="checkbox"/> Master Pilot<br>Big plane flying. Open to transport license holders.  | <input type="checkbox"/> Master Pilot Ground School<br>864 hours (lecture-shop) 18 subjects.          |  |

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Aero Digest, Sept., 1929

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Machined Parts and Castings to Order  
Consulting Engineer Service

Edward J. Alpaugh, N. A., M. E.



(Hawaiian News continued)

clamation system, \$15,000; aero supply house, \$45,000; photographic laboratory, \$36,000; paint and dope house, \$5,000; radio station, \$10,000; armament and parachute station, \$15,000.

**WITHIN** two years, possibly, the Good-year-Zeppelin Corporation may have dirigibles operating on a regular schedule between Los Angeles and Hawaii.

The mooring mast erected several years ago in the Ewa district in anticipation of a visit by the naval airship *Shenandoah*, still stands in excellent shape having been cared for carefully since the day it was completed. The mast is 175 feet high.

## UTAH

[GLENN FERRINS]

**ANNOUNCEMENT** was made recently of the incorporation of the Depot Auto Repair Company and the Intermountain Flying Service of Prince, Utah, into one concern, with a capitalization of \$100,000. This company will be known as the Intermountain Flying and Automotive Service Company, Inc.

**A** REVOLVING beacon recently arrived at Ogden Airport, Utah, and will soon be installed. This addition will make night flying possible. Work has been begun on the construction of a tower upon which will

be mounted the 2,500,000 candlepower revolving light. It will be visible for a distance of 50 miles.

**PRELIMINARY** survey work on Cache County's new airport has been started about two miles from Logan, Utah. It is planned to have the landing field completed for opening on Labor Day.

**FEDERAL** air traffic rules of the U. S. have been adopted by Salt Lake City, together with special city regulations as applied to flying, such as the prohibiting of stunting over the city. Fliers are liable to fines not exceeding \$299, or imprisonment, for violation of the rules.

**AERIAL** tactics of the 329th observation squadron, in summer training at the Salt Lake City airport, were recently coordinated with officers' work by the use of radio telegraphy. Bombing practices, with dummy bombs, were added to the thrills of airport fans, who came to see the flying practice. Parachute jumping and parachute racing were added to the flying circus staged by the 329th Observation squadron.

Completion of the new municipal airport road was recently announced and auto service to and from the airport was inaugurated. Weather reports were broadcasted every three hours from the field offices. Salt Lake City's importance as an air center will be increased with the establishment of a line by the Pickwick Air Lines between Nogales,

Arizona, and Salt Lake. This will make the sixth airline entering the city, the other five lines being the Boeing line to San Francisco and Chicago, the Western Air Express to Los Angeles, the Varney Air Line to Pasco, Washington, and the National Parks Airways to Great Falls, Montana.

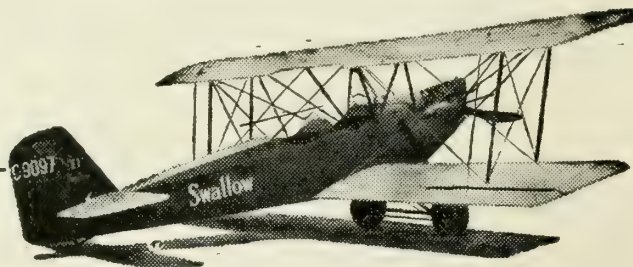
**THE** National Parks Airways, Inc., has completed its first year on the government contract for carrying the airmail between Salt Lake and Great Falls, Montana, with stops at Ogden, Pocatello, Butte and Helena. During this time 61,870 pounds of mail passed over the line and 870 paid passengers were carried.

Seagull lines, Inc., plans to establish regular air mail and passenger service between Salt Lake and the Uintah basin. Communities have already laid out landing fields. One round-trip daily is being planned.

**APPROXIMATELY** \$100,000 will be spent during the year by the government in putting in airplane beacons and emergency landing fields along the Salt Lake-Great Falls airway going through Idaho Falls. Bids for the lighting will be let, beacons placed, and a number of landing fields completed before winter, according to plans recently announced.

**KENNETH H. TURNER** and **H. C. Hollenbeck** have been appointed pilots and a new Stearman plane has been added to the equipment of the National Parks Airways to care for increased business.

# Prestige!



## THE SWALLOW T-P (Training Plane)

is another example of Swallow Craftsmanship—the ideal training plane. A safe, speedy and sturdy ship. Designed for the discriminating buyer.

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**THE SWALLOW AIRPLANE COMPANY**  
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**J. E. GRANGER, INC.**  
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*"If you have never had the opportunity to examine MILLER AIRPLANE PRODUCTS at first hand. . . . then the chance of a life time to do so is at Cleveland, where our products will be on exhibit and demonstrated by the largest airplane supply houses in the world. ¶ Don't forget—read over our list of Factory Representatives at the bottom of this ad and be sure to look them up at the Cleveland Show. ¶ I will be there with bells on, looking for you."*

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## CRAWFORD AIRPLANE SUPPLY COMPANY

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40,000 Government specification turnbuckles, all sizes. . . . .	25c to 45c ea.
10,000 Yards Government specification grade AA fabric. . . . .	43c per yd.
2,000 Hatot, Zenith, Taylor, and Neco Altimeters. 25,000 foot register, 3 1/2" dial. . . . .	\$7.50 to \$15 ea.
50,000 A. C. Rajah, Splittorf, Bethelene, and other makes of airplane spark plugs. . . . .	25c ea.
800 Liberty cylinders. . . . .	\$40.00 ea.
2,000 OX5 connecting rods. . . . .	\$1.60 ea.
10,000 Connecting rod bolts. . . . .	.5c ea.
80,000 OX5 exhaust and intake gaskets. In lots of 1,000. . . . .	.8c ea.
Government specification safety belts. . . . .	\$3.75 ea.; worth \$7.50
800 Pounds brass peel shims for all bearings on OX5 motors. . . . .	10c ea.
OX5 cylinders. . . . .	\$20.00 ea.
100,000 Government specification bolts and nuts. . . . .	3c to 12c ea.

### MOTORS

New Siemens-Halske, 7 cylinder, 125 h.p. . . . .	\$1,200.00 ea.
New Valie, 5 cylinder, 60 h.p. . . . .	650.00 ea.
New Hallett, 7 cylinder, 140 h.p. . . . .	1,250.00 ea.
New latest model Kinner. . . . .	1,250.00 ea.
Late model Anzani, 80 h.p., mechanical valves. . . . .	450.00 ea.
Late model Anzani, 45 to 60 h.p., mechanical valves. . . . .	450.00 ea.
J4 Whirlwind with extra parts. . . . .	1,250.00 ea.
Model A. Hissco, good condition, complete. . . . .	250.00 ea.
Liberty motors, good condition. . . . .	250.00 ea.
K-6 motors, good condition. . . . .	350.00 ea.
VXX2, 8 cylinder Curtiss, 200 h.p. . . . .	250.00 ea.

ALSO:

Mercedes, B. M. W., Renault, Rolls Royce, Gnome, Le Rhone, Curtiss D-12, Aeromarine, Whirlwind, all makes of motors and parts, including gaskets in sets.

ALL MOTORS ARE SENT SUBJECT TO INSPECTION.  
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Wind cones	Helmets	Clevis pins
Goggles (Protector,	Resistal and other makes)	Dope
Airplane fabric	Tools	
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"IF IT FLYS WE HAVE IT"

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200 D. H. Wheels, or wheels of any kind.  
OX5 parts, Hissco parts.  
Airplane motors.  
Bolts.

SUPPLIES OF ANY KIND FOR SPOT CASH. WRITE US QUOTING  
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50 Brand new H-3 Hispano-Suiza motors in the original crates. They cost \$6,250 cash. 390 h.p. at 2,200 R.P.M. Make us an offer on the lot.

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200 Airplane storage batteries. . . . .	\$10.00 ea.
40,000 OX5 Burd piston rings. . . . .	\$75.00 per thousand
500 Dixie magnetos for Le Rhone motors	
200 German water proof D U 6 magnetos	
400 Simms Bosch 8 cylinder magnetos	
100 Dixie number 800 magnetos	
100 1 1/4" Miller carburetors	
100 2" Miller carburetors	
100 2" Zenith carburetors	
2,000 Large Hess Bright ball bearings.	
100 Le Rhone propellers	
800 pairs Liberty connecting rods	
10,000 pounds Liberty parts including gears, manifolds, valves, etc.	
400 32 Ampere, 13 volt, streamlined airplane generators, complete with propellers and brackets. Cost \$100. Price \$25 ea.	



## IDAHO

[IDA M. DURNIN]

APPROXIMATELY \$100,000 will be spent during the year by the Government in putting in airplane beacons and emergency landing fields along the Salt Lake-Great Falls, Mont., airway going through Idaho Falls, according to Ray I. Hess, of Washington, D. C., assistant civil engineer in charge of the survey and construction work on intermediate landing fields.

The work to be done along the airway consists of installing large electrically operated beacons, smaller blinker lights and intermediate emergency landing fields. About

\$60,000 will be spent in lighting the route, while between \$30,000 and \$40,000 will be spent in conditioning the emergency landing fields.

A GROUP of army map makers, headed by Lieutenant Edwin B. Bobzein of Crissey Field, California, has been detailed to survey the Newsome quadrangle, which lies in the mountainous country southwest of Grangeville, Idaho. Lieutenant Bobzein expects to complete in a month an accurate mosaic of the territory.

Since there are no landing fields in the district nor cleared space large enough to permit landing, the plane works out of Grangeville, where there is an airport.

AN airport ceremony, celebrating the start of improvement work on the municipal port in Boise, Idaho, was held August 4th. Steam shovels, drag lines and other equipment to be used to build the \$78,000 airport and change the channel of the Boise River, were on the field ready to operate at that time. Mayor Pope and other city and service club officials turned shovels of earth, celebrating the start of the work.

A DOPTION of a resolution, authorizing the city of Pocatello, Idaho, to purchase a 340-acre tract of land west of the city for airport purposes, was a feature of a recent city council meeting. The land includes a present airport.




**OK**

The KREUTZER TRI-MOTOR AIR COACH has received the O. K. of pilots, dealers and purchasers. The Kreutzer franchise has been adopted by dealers because it is profitable. The Kreutzer is one of the KNOWN factors in aviation... the Airplane of Business and Industry.

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**SERVICE**

IN the past few weeks the department of law enforcement, acting under the new Idaho Air Commerce Act, has prevented two flights and licensed fourteen aircraft, including the Varney fleet. Fifteen pilots have received Idaho licenses, including some air-men from outside the state who have occasion to fly within its borders.

[GLEN PERRINS]

SURFACING of the Twin Falls, Idaho, airport is being completed. At a recent American Legion meeting in Twin Falls, the members of the Legion approved a suggestion to appropriate enough money for marking the new municipal airport to meet federal requirements.

COMPLETION of a new hangar, and moving of general offices and equipment of the National Parks Airways from Salt Lake to Butte, was marked by air celebra-

tion at Butte late in July. Many planes took part in the event. The hangar measures 100 by 140 feet, and includes offices, passengers' waiting room, and repair shops.

WORK is being rushed on the new hangar at the Boeing Air Transport Company at Cheyenne, Wyoming, in order to accommodate the new 18-place planes to be put in operation on the transcontinental route. The hangar will be the largest on the line between San Francisco and Chicago, being able to accommodate planes with a wing span of 80 feet. The repair division of the company, now in Salt Lake, will be moved to the Wyoming city.

EVERY airplane licensed in Idaho would carry a map of the state stenciled on its wing and a serial number, under a plan mapped out by the department of law enforcement. Adoption of the marking, as

provided under the act passed by the last legislature, will depend upon approval of a federal aeronautics official.

AN official airport is assured to Salmon, Idaho, as a deal has been closed for the purchasing of 120 acres of land lying on the highway four miles south of the city. Mayor C. F. Hanmer has signed the papers.

ALMOST \$70,000 will be spent on the Boise airport, the river being dredged for runway material, and the construction of a levee the length of the airport planned.

THE survey of the Great Falls-Salt Lake airline will be completed in the near future under the direction of General R. Fitzgerald, airways extension superintendent of the Department of Commerce, who arrived in Boise recently. Landing field sites are being located along the line.

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THE BOARD OF DIRECTORS of the Detroit Aircraft Corporation includes men long and prominently identified with the rise of the automobile industry—and with the development of aviation. They are pledged to apply to the designing, building and marketing of aircraft the same efficiency in engineering, production, sales and service which has made the automobile business the world's leading industry. Their objective is to open the skyways to an ever-increasing number of air travelers through the economical development of improved aircraft of all types.

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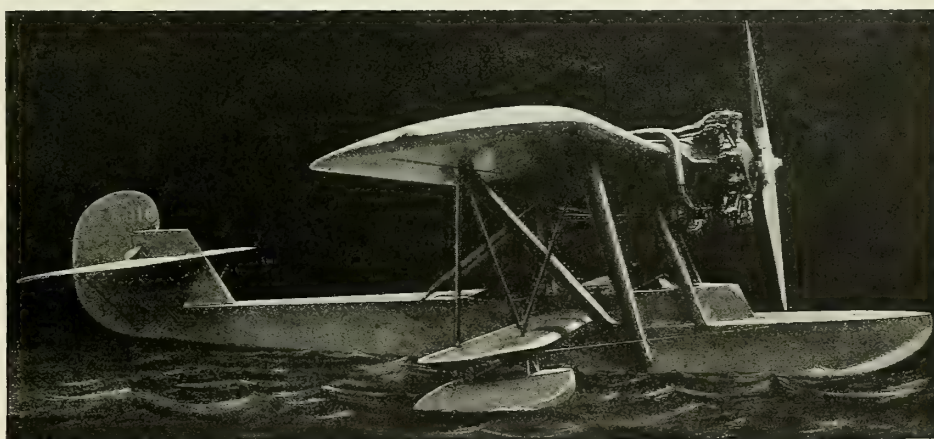


The Detroit Aircraft Corporation is exhibiting three of its units at the Cleveland Aeronautical Exposition, Aug. 24th—Sept. 2nd.

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*The Lockheed Monoplane for Five, with Pratt & Whitney 410 H. P. Wasp Engine.*

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*The Eastman Four-Place Flying Boat, with 180 H. P. Curtis Challenger Motor.*



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See these ships at the Cleveland Show or write the Detroit Aircraft Corporation, 3300 Union Trust Building, Detroit, Michigan for complete information.



# AERONAUTICAL INDUSTRY

## GRAF ZEPPELIN'S WORLD FLIGHT

**T**HE German dirigible *Graf Zeppelin* is at present making a demonstration tour around the world, which many lighter-than-air enthusiasts believe will adequately prove the practicability of using dirigibles for regular international transport service. The world tour began officially when the airship left Lakehurst, N. J., at 12:40 a.m. on August 8, bound for Friedrichshafen, Germany. The Zeppelin appeared over her home base at Friedrichshafen fifty-five hours later, having successfully crossed the Atlantic Ocean twice within a period of ten days.

On August 15th, the dirigible left Friedrichshafen for Tokio, Japan, the next leg of the world journey—an airline distance of between 6,000 and 7,000 miles. At the time this is being written the ship is between Moscow and Leningrad. After crossing European Russia, the Zeppelin's route is over some of the wildest territory on earth, the steppes of Siberia. Dr. Hugo Eckener, commander, estimated that the trans-Siberian trip would require about 120 hours' continuous flying. The *Graf Zeppelin's* greatest test previously was 111 hours on her first trans-Atlantic crossing, last year.

From Tokio, the great rigid airship will fly eastward across the Pacific Ocean to Los Angeles, Calif., thence across the American continent to Lakehurst, where its globe-circling flight will be completed.

When the *Graf Zeppelin* left Friedrichshafen, there were sixty-one persons aboard, —twenty passengers and forty-one crewmembers. In addition, the airship is carrying 50,000 pieces of mail and 25,000 kilos of oil, gasoline, luggage and equipment. Sixteen of the passengers booked passage all the way to Lakehurst, nine having arranged to make the complete trip. Those who are making the entire journey are Lady Grace Drummond Hay, Sir George Hubert Wilkins, Carl von Wiegand, Robert Hartman, Commander Charles E. Rosendahl, Lieut. J. C. Richardson, William B. Leeds, Joachim Rickard and Heintz von Eschwege-Lichberg.

In flying from Germany to the United States before the start of the round-the-

world flight, the Zeppelin landed on the evening of August 4 at the Navy hangar at Lakehurst ninety-three hours and twenty-three minutes after she had left Friedrichshafen, having covered 5,000 nautical miles and having spent more than two hours on a visit to New York. The time required to fly from the coast of Europe to the coast of North America was sixty-seven hours and thirty minutes. Although no major meteorological disturbances interfered with the trans-oceanic passage, the airship's speed was cut down considerably by head winds over France, Spain and the Mediterranean. Head winds were encountered more or less intermittently during the rest of the flight.

On the return trip to Germany, however, the *Graf Zeppelin* was favored with such good winds that she was able to accomplish the crossing in less time than any dirigible has previously. This fifty-five-hour voyage did much to quiet a rising criticism of lighter-than-air practicability.

## TO DEMONSTRATE PRACTICAL VALUE OF REFUELING

**A** REFUELING airline-distance and endurance flight, making two round-trip transcontinental flights and then hovering over the National Air Races, was to be started during the third week of August, by the combined interests of the Army Air Corps, the Post Office Department, and the Boeing Air Transport, Inc. The flight is an effort to put to practical use the knowledge of refueling in the air acquired through the recent refueling endurance records. A Boeing mail plane will make the airline endurance flight. It will be the first endurance non-stop flight attempted with a commercial plane with a high powered engine, flying over an established airway on a regular schedule.

This project was announced in Seattle by P. G. Johnson, president of the Boeing companies, after arrangements had been completed with the Army Air Corps and the Post Office Department, which has author-

ized the carrying of mail on the endurance plane. The endurance plane has been named the *Boeing-Hornet Shuttle*, as it is planned to make four trips between the Atlantic and Pacific seabords before the flight over the Cleveland Airport.

Pilots on the mail endurance plane will be Captain Ira Eaker, chief pilot of the *Question Mark*, and Lieutenant Bernard Thompson, who was a pilot on the Army's Pan-American Good Will Flight in 1926. Captain St. Clair Street, leader of the Army's New York-to-Nome expedition some years ago, and Lieutenant Newton Longfellow, will each pilot an army refueling ship, and each will have two assistants. Two Boeing system transcontinental air mail pilots will man two Boeing refueling planes.

The endurance ship will be a Boeing Model 95 mail plane of the type now used on the New York-Chicago-San Francisco route. The *Boeing-Hornet Shuttle* is a large capacity, mail-cargo biplane. It has a high speed of 142 miles an hour, and cruises at 125 miles an hour. It is powered with a 525-horsepower Pratt and Whitney Hornet engine, and, with a load, it can climb 950 feet a minute to a ceiling of 16,000 feet. In addition to the endurance plane, there will be four refueling aircraft. Two will be Boeing mail four-passenger cabin biplanes, and two will be Army C-1 transports, which were used to fuel the *Question Mark* on its endurance flight.

The endurance plane is slightly altered to enlarge its gasoline capacity. Unlike other endurance flights, where planes were flown over an airport with the motor throttled, the *Boeing-Hornet Shuttle's* engine will turn up 1,700 revolutions a minute throughout the flight. The *Shuttle* will weigh  $3\frac{1}{2}$  tons fully loaded for the take-off from the Oakland airport. This is the first time that an engine of more than 300 horsepower has been tested in an endurance flight, and the first time that a flight has been made under operating conditions.

The purpose of the project is to determine the feasibility and applicability of refueling transcontinental air mail carriers in flight, to collect experimental data on cross-country military endurance flying, and to subject, for

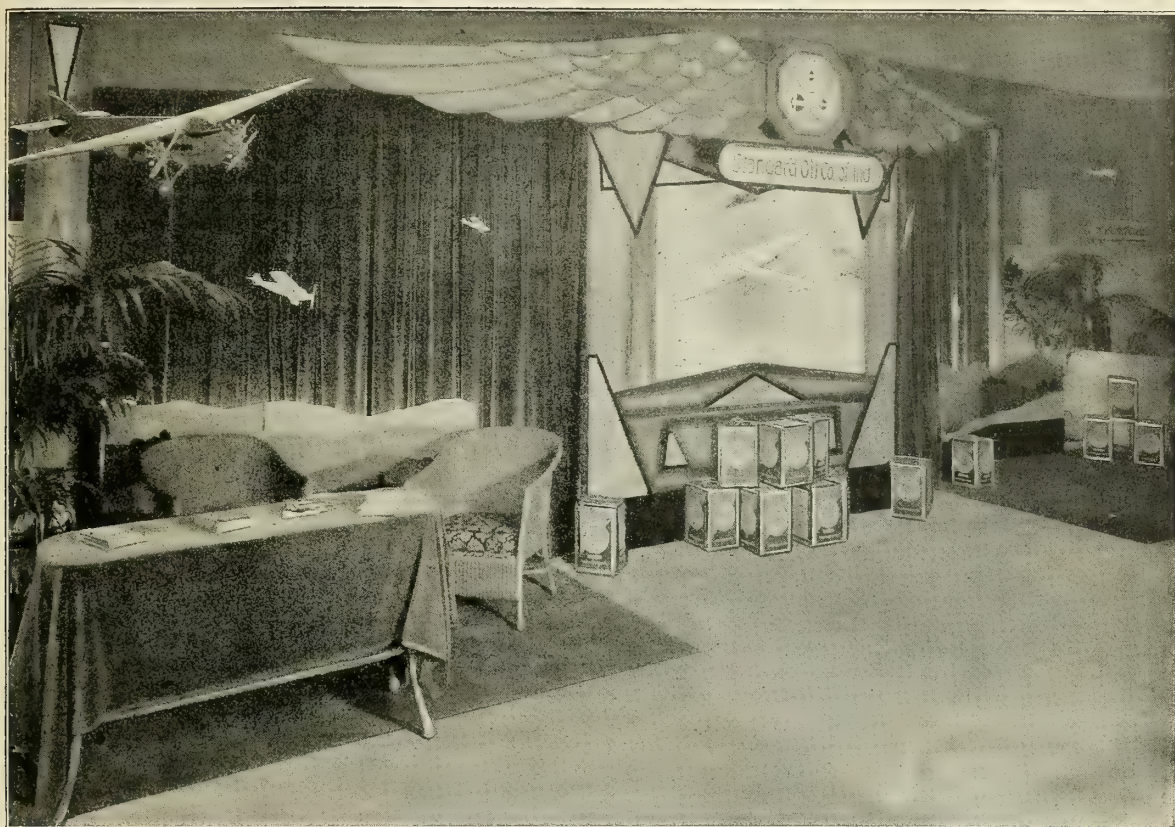
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# MAKE BOOTHS 224-225 YOUR HEADQUARTERS

You are cordially invited to make the Standard Oil Company (Indiana) booths your headquarters when you visit the National Aeronautical Exposition at Cleveland, August 24th to September 2nd.

We have a message to deliver which is of very definite value to everyone interested in Aviation.

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(Continued from preceding page)

the first time in endurance flights, a high powered airplane engine to a gruelling test such as will be required in this enterprise.

Under the tentative schedule worked out by Army officers and Boeing Air Transport officials, the plane will leave San Francisco at 10:00 a. m., refuel at Elko at 2:00 p. m., at Cheyenne at 6:00 p. m., at Omaha at midnight; discharge bags of air mail at Chicago en route to Cleveland, where the plane will be refueled early in the morning, with an arrival over Mitchell Field, New York, at 6:00 a. m., flying back to Cleveland where it will refuel at 10:00 a. m. Other refueling points on the westbound trip will be: Omaha, 3:00 p. m., Cheyenne, 7:00 p. m., Elko at midnight, and arrival at 3:30 a. m. over San Francisco, and a flight back to Elko to take on gasoline. After the two round trips across the country the *Boeing-Hornet Shuttle* will go to Cleveland, where the National Air Races will be in progress, and remain aloft until the conclusion of the flight.

The dusk to dawn units of the flight will be from a point in Wyoming to Chicago, eastbound, and from Cleveland to Grand Island, Nebraska, westbound, on the first trip. The Boeing mail plane will be equipped with regular night flying equipment now used in transcontinental mail service. The fliers will have a well-lighted airway between the East and West Coasts. There are now 111 lighted emergency fields, 232 twenty-four inch revolving beacons and 529 blinker lights, on the 2,700-mile span of mountains and plains separating the two seaboards. The route extends over a terrain which has great variations of altitude and temperature. Between San Francisco Bay and Elko the ship will fly from sea level to 12,000 feet to clear the Sierra Nevada Mountains, and on the eastern end must bridge the Alleghenies.

## WOMEN'S CATEGORY RECOGNIZED BY F.A.I.

A WOMEN'S category has been created in official aeronautical world's records by the Federation Aeronautique Internationale, according to an announcement made recently by Lady Mary Heath. Lady Heath

requested the formation of such a category in 1926, and she was notified that her request had been granted.

The National Aeronautical Association, which represents the federation in international aeronautical record rulings in the United States, has held heretofore that there is no difference to be recognized in making flying records between men and women, emphasis being placed on the performance of the craft rather than the flier.

## FIFTH INTERNATIONAL AIR CONGRESS

THE Fifth International Air Congress will be held at the Hague, Holland, from September 1 to 6, 1930. The other meetings of the Air Congress took place at Paris in 1921, London, 1923, Brussels, 1925, and Rome, 1927. The 1930 meeting will be held in Holland upon the invitation of the Royal Government of the Netherlands.

The business of the Congress will be divided into five sections as follows: aerial traffic, including air routes, staffs, materials, radio aids, airlines and meteorology; scientific and technical, covering construction, propulsion, aerodynamics, instruments, and aircraft other than airplanes; legal, which will consider the rights of the industry; medical and touring.

## PARACHUTES TO BE REGULATED

THE Department of Commerce is preparing to regulate the manufacture of parachutes for commercial aviation. Under plans of the department recently announced, approved type certificates are to be issued to parachute manufacturers.

The first regulations to be put in force will cover only individual parachutes which are strapped to aviators' bodies and opened by a rip cord. The regulations will require that the rider be able to release himself quickly from the harness in the event of a landing in water. Parachutes submitted for licensing will receive practical tests. They will be required to open fully in twenty-five drops with a 200-pound dummy man from an airplane traveling sixty miles an hour, and from an altitude of not more than 150 feet. Other tests by dropping similar dummies

from a plane 500 feet from the ground will require parachutes to open fully even when twists are packed in the suspension lines.

In the tests of strength, parachutes will be dropped five times with an 800-pound lead weight load. The regulations also will require that the rate of descent does not exceed eighteen feet per second. The regulations will require that silk canopies be replaced after four years, cotton canopies after two years, and harnesses after two years.

## SURVEY OF STATE AERONAUTICAL LAWS

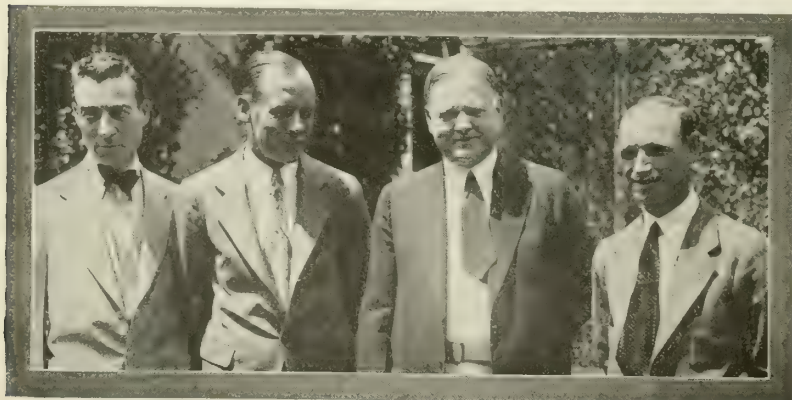
THE Aeronautical Chamber of Commerce of America recently issued a report showing a distinct increase in the trend of legislation affecting aviation. The report was prepared by Prof. Harry J. Freeman of the New York University Law School.

Forty-one states considered legislation on aviation during the year; 36 states enacted laws on the subject; 21 defeated such measures, and 18 have bills with action pending or data unavailable. Seventy-one of the bills introduced in 1928-29 were aimed to regulate or license aircraft or pilots. Eighty-four general acts and 35 special acts introduced authorized the establishment, maintenance and regulation of airports; and 60 were of a miscellaneous character.

## NEW CHIEF APPOINTED IN COMMERCE SECTION

KENNETH M. LANE, designer of the Wright Apache airplane which last May broke the world's altitude record, has been appointed chief of the Commerce Department's Aeronautical Engineering Section, it was announced recently by Clarence M. Young, Director of Aeronautics. A graduate of Massachusetts Institute of Technology, Mr. Lane has had four years' aviation experience with the Government at McCook Field, two years with the Dayton-Wright Company at Dayton, Ohio, and six years with the Wright Aeronautical Corporation of Paterson, New Jersey. As chief calculator, chief designer, and chief airplane engineer for the Wright company, he designed the Wright Apache airplane with which Lieut. C. C. Champion and Lieut. Apollo Soucek established new world altitude records.

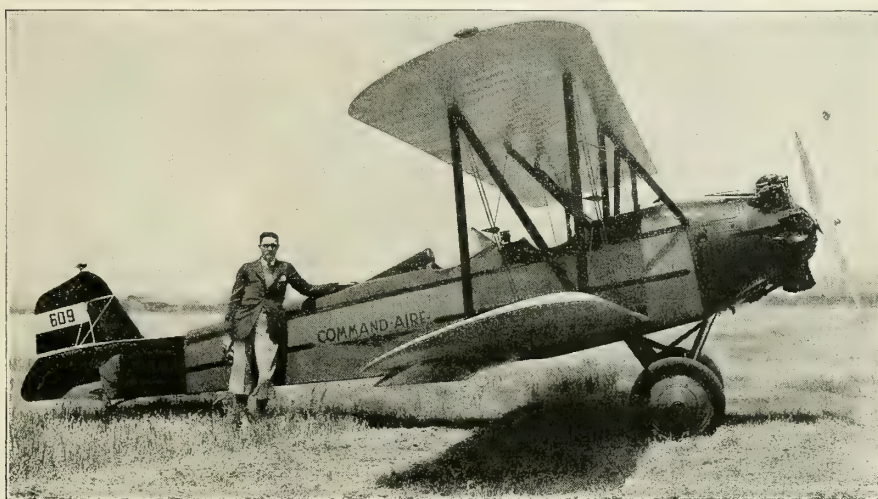
The primary function of the engineering section of which Mr. Lane will have charge is to determine that aircraft, for which licenses are issued, are airworthy when they leave the factory at which they are built. This section examines in detail the specifications, stress analyses, structural designs, and drawings which are submitted by the manufacturer to the Department of Commerce. It inspects materials of construction, workmanship and fabrication methods used at the factories. It examines production aircraft to determine whether they are built in exact accordance with the submitted specifications and drawings, and it determines the maneuverability and general flying qualities of all aircraft on which approved type certificates are requested.



Maj. Young, Capt. Yancey, President Hoover and Roger Q. Williams on the White House lawn after the Rome fliers had been congratulated by the President

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*During a recent western tour, pilot flew this Command-Aire from San Diego to Los Angeles in one hour and thirty-eight minutes without once touching the stick. Command-Aire's model 5C3 powered with Curtiss Challenger 170 H. P. Motor*

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# COMMAND-AIRE



THE PLANE FOR WIDER SALES



## AIRCRAFT EXPORTS SHOW GAIN

AERONAUTICAL exports for the first half of 1929, with a total value of \$5,174,656, exceeded those for the entire year 1928, which amounted to \$3,664,733, according to figures recently made public by Leighton W. Rogers, Chief of the Aeronautics Trade Division, Department of Commerce. These figures show that 199 aircraft, valued at \$3,290,949, were exported during the first six months of the current year as compared with 162, valued at \$1,759,653, for the whole of last year, or 87 for the first half. Mexico, with purchase of 62 airplanes, at a valuation of \$1,316,874, was the leading market, followed by Canada with 44, Chile 32, Argentina 11, Hong Kong 11, Japan 8, China 5, Panama 4, Peru 4, the Philippines 3, Italy 2, Cuba 2, and Colombia, Brazil, Great Britain, Guatemala, French Oceania, Australia, New Zealand and Uruguay one each. China, Mr. Rogers stated, received five airplanes by direct shipment, with the additional 11 trans-shipped through Hong Kong. The two new markets for aircraft exports, Mexico and Chile, were developed, he explained, as a result of practical demonstrations in the field.

Total aircraft engine exports were 178, valued at \$830,282, as compared with 65,

valued at \$206,916, for the first half of last year. Although Europe purchased but few complete aircraft, Germany was the destination for 45 engines at over \$300,000 and Poland 32 at \$100,000. The average unit value of aircraft exported during the first six months of the year increased from \$10,850 to \$16,500 over last year, and the unit value of engine exports increased from \$3,700 to \$4,650.

Foreign shipments of airplane parts and accessories were valued at \$1,053,525 as compared with \$1,243,500 for the whole of last year. This item went mainly to countries already largely using American airplanes, although Germany and Soviet Russia figured to the extent of over \$60,000 each in the trade.

The month of June, 1929, set a new high mark for exports in a single month, the shipments during that time having exceeded even the shipments to Europe during the war. Fifty-three aircraft valued at \$855,879, twenty-nine engines valued at \$111,827 and \$207,015 in parts, were exported.

Mr. Rogers stated that the Department of Commerce, through 63 foreign offices and 24 domestic offices, is extending its service to the industry in the matter of exports.

## CONN. SCHOOL OF AVIATION MEDICINE

CONNECTICUT has established the country's first school of aviation medicine for civilians. Dr. William B. Smith is director of the institution which is to be sponsored by the Connecticut Department of Aeronautics, of which Captain Clarence M. Knox is the head. Dr. Smith is a graduate of the U. S. Army School of Aviation Medicine, the only other school of aviation medicine in the country.

The state has been divided into five sections about Bridgeport, New Haven, New London and Danbury, with headquarters at Hartford. From each section a doctor has been selected to take the first course at the school and when each has completed his school work he will take over the examination of applicants for pilots' licenses in his respective territory. The faculty will include leading physicians and surgeons of the state. The work will consist of lectures, demonstrations, and actual air work, and each student-doctor will be required to average one hour's flying time a month, which will be done in the State Department's Vought Corsair biplane. Besides lectures from leading state doctors, the students will also receive instruction from army doctors, specialists in aviation medicine, members of U. S. Army school at Brooks Field, and will spend 6 weeks at Brooks Field where they will receive special instruction in aviation physiology and altitude work.

The new administration building of the State Department of Aeronautics, which has just been completed at Brainard Field, has helped make possible the new school. The new laboratory contains modern equipment. The greatly increased demands being made

on the Department for physical examinations for pilots' licenses and other tests have necessitated the establishing of the school. Dr. Smith has examined over 600 people for pilots' license during the past two years, the average to date being 50 per month.

## SIKORSKY JOINS UNITED AIRCRAFT

THE Sikorsky Aviation Corporation has merged with the United Aircraft and Transport Corporation according to an announcement made by F. B. Rentschler, president of the United interests. The Sikorsky company has just opened a new factory at Bridgeport, Conn., and has 200 men at work on production there. When fully developed, the new factory will employ 1,200 men. The present factory at College Point, Long Island, N. Y., will be operated until the first of next year. The officers and personnel of the Sikorsky company will not be changed, Mr. Rentschler declared.

Orders now on the books of the Sikorsky corporation will absorb the next six months' production of the twin-motored amphibians for which the company is known.

Mr. Sikorsky, the chief designer for the company, built more than seventy multi-motored bombers for the Russian Government during the war. In 1917 he went to France, where he started the construction of planes for the French Government, and in 1919 he came to America. At first he concentrated here on twin-engined biplanes. Early in 1927 he turned out his first twin-motored amphibian at the then newly opened College Point plant. At present he is working on a multi-motored flying boat, in which, it is reported, the United States Navy is interested. An experimental small sport model am-

phibian is also under way in the Sikorsky plant.

The United Aircraft and Transport Corporation is a holding company sponsored by the National City Company of New York and is comprised of the Pratt and Whitney Aircraft Company of Hartford, builders of the Wasp and Hornet air-cooled engines; the Chance Vought Corporation of Long Island City, builders of the Vought Corsair; the Boeing Airplane Company, the Pacific Air Transport, the Boeing Air Transport, the Stout Airlines, operating between Chicago, Detroit and Cleveland; the Hamilton Metal Plane Company and the Hamilton Aero Company of Milwaukee. The company also recently acquired a substantial interest in the Aviation Corporation.

## CURTISS-WRIGHT BUSINESS REPORT

A COMPARISON of unfilled orders of the Curtiss Aeroplane and Motor Company, Inc. for the first six months of 1928 and 1929 shows an increase of over 73%, the unfilled orders for this year being \$9,123,887.12 as against \$5,255,545.81 last year. A comparison of the unfilled orders as of July 1st, of the Wright Aeronautical Corporation shows an increase from \$7,054,106 in 1928 to \$7,996,985 in 1929.

The gross sales of the Curtiss Aeroplane and Motor Company, Inc., for the first six months of 1929 were \$6,230,454.07 being an increase of more than \$1,100,000 over the figure for 1928 which was \$5,118,098.08. The sales of the Wright Aeronautical Corporation for the first six months of this year show an increase of nearly double those of last year, the figure for 1929 being \$6,184,235 as against \$3,579,822 for 1928.

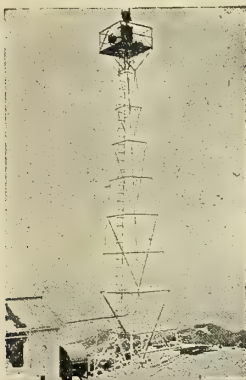
This gives a combined gross business for both companies of \$12,414,689.07 for the first six months of this year, an increase of more than \$3,716,000 over last year, or more than 42 per cent. The combined unfilled orders this year of the two companies amounts to \$17,120,872.12, an increase of \$4,811,220.21 or more than 28%.

## FARMAN TO ENTER AMERICAN INDUSTRY

FARMAN BROTHERS of France, will enter the American aviation field with the formation of an American corporation with financial support of an American banking group, according to a recent report. Farman Brothers operate a large airplane manufacturing plant and extensive airlines in Europe.

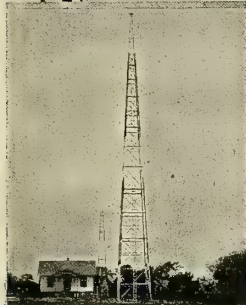
The American corporation plans to start production of Farman planes at a plant to be located near Wheeling, West Va., and an assembly plant, which will serve as a demonstration and sales base, is contemplated near New York or Philadelphia. Tentative arrangements have been made to locate this on the Central Airport at Camden, N. J. According to official announcement, the American company will have the exclusive right in the United States to all of the Farman airplane patents. It is proposed to

(Continued on next page)



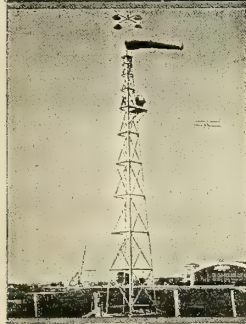
AIRWAY  
BEACON  
TOWERS

U. S. Dept.  
of  
Commerce



RADIO  
BEACON  
TOWERS

T. A. T.  
U. S. Dept.  
of  
Commerce

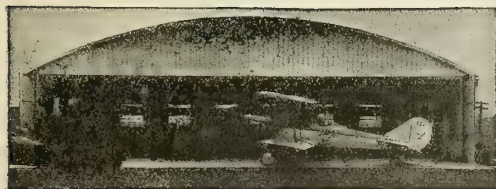


CEILING  
LIGHT and  
WIND CONE  
TOWERS

Port Columbus



BOUNDARY  
LIGHT  
SUPPORT



CURVED ROOF STEEL HANGAR

TRANSCONTINENTAL AIR TRANSPORT, INC.



ST. LOUIS, Mo.

GENERAL OFFICES  
SYNDICATE TRUST BLDG.  
10TH AND OLIVE STREETS

July 10, 1929

International Derrick and Equipment Co.  
Columbus, Ohio

Gentlemen:

Nearly a year ago when preliminary plans were being formulated for the elaborate airway communication stations of Transcontinental Air Transport, the selecting of appropriate radio antenna towers assumed a position of vital importance.

My past experience with International Derrick and Equipment Company towers, while in charge of the construction of several hundred miles of airway, led to the selection of more IDECO towers for this exacting duty, and I wish to express to you the real satisfaction afforded by my selection.

The IDECO radio towers ran true to form in that they were quickly and easily erected. The various parts fit with the nicety of a precision instrument, and properly primed and painted over the hot dip galvanized finish they stand as a permanent monument to progress and aviation.

Yours very truly,

*E. W. Proctor*

E. W. PROCTOR  
Communications  
T. A. T. Inc.

ENP:AB

## 90% of the World's Lighted Airways are using IDECO Beacon Towers

Years of specialization have given us an experience in building airway and airport equipment unequalled by any organization in the world.

IDECO equipment is used by the U. S. Army, Navy, Department of Commerce; The Transcontinental Air Transport Inc; The Texas Air Transport and by many Municipal and private airports.

Call or write our nearest branch, we will gladly give you the benefit of our experience in meeting your requirements.

## THE INTERNATIONAL DERRICK & EQUIPMENT COMPANY

COLUMBUS, OHIO

LOS ANGELES, CALIF.

New York

Detroit

Wichita

Tulsa

Ft. Worth

Houston

Shreveport

Denver

Maracaibo, Venezuela



(Continued from preceding page)

use American-built engines in the planes constructed in the United States. Two of the planes to be built in the United States will be a 50-passenger four-motored machine and the other a 25-passenger tandem-motored plane.

## MAMER FLYING ACROSS CONTINENT AND BACK NON-STOP

TO demonstrate that refueling in flight is practical for commercial airplane passenger, express, mail and freight service, Lieut. N. B. (Nick) Mamer and Art Walker, both of the Mamer Air Transport, left Spokane, Wash., on August 15th at 6:00 p.m. in an attempt to set the first round trip coast-to-coast non-stop refueling record. A group of Spokane business men revived the National Air Derby Association of Spokane, sponsors of the 1927 National air races and derbies from New York and San Francisco to Spokane, to sponsor the flight. A fund of \$10,000 was raised to stage the event. The Buhl Aircraft Corporation, Marysville, Michigan, provided a six-place Buhl air-sedan powered with Wright J-6 engine, to be used as the endurance plane. R. C. Holmes, president of the Texaco Oil Company, whose products Mamer is using, provided two refueling planes, one at Cleveland and another at New York.

Lieut. Mamer decided to fly from Felts Field, Spokane, Wash., to Swan Island airport, Portland, Oregon. From there his plane headed to San Francisco, picking up the transcontinental air mail route. Two refueling planes of the Mamer Air Transport, a Ryan brougham and a four-place Buhl Airedale, were equipped with 150-gallon gasoline tanks for the western refueling stations. One of the Mamer planes refueled the Buhl at San Francisco, and then returned to Felts Field. The second Mamer refueler emptied its 150 gallons

of gasoline into the non-stop plane at Cheyenne, Wyo., and then proceeded to St. Paul.

At Cleveland, Ohio, the first refueling ship of the Texaco Company was to contact with Mamer and Walker, unloading enough fuel to carry them to New York, where another Texaco would conduct a refueling. The Cleveland ship was to make a second refueling on Mamer's westward flight to St. Paul, and there the Mamer refueler would give it its sixth supply of gasoline.

The coast-to-coast non-stop refueling flight will be completed in about 72 hours, according to the plans. The two refueling planes of the Mamer Air Transport have refueling hoses 50 feet long attached to 150-gallon tanks. The outlet is through the right side of the plane, thereby giving the refueling pilot a better visibility than where refuelings are made directly above.

The six-place Buhl Airedale was equipped at the factory for refueling. A special 300-gallon tank was installed, and 18 special oil lines were run from the Wright J-6 motor to the cabin for forced oil feed. The special oil tanks were built along the bottom of the cabin occupied by the six seats. This plan allowed the fliers to stretch out and sleep.

## Embry-Riddle Flying School Awarded Approved Certificate

THE Embry-Riddle Flying School, branch of the Embry-Riddle Company at Lunken Airport, Cincinnati, Ohio, is one of the first group of five schools, in the United States, to be awarded the Approved School Certificate, in accordance with the regulations and requirements of the Department of Commerce.

Embry-Riddle school offers the following courses; primary ground school, 64 hours; advanced ground school, 128 hours; private pilot, minimum of 18 hours, dual and solo time; limited commercial, 50 hours; and transport pilot's course, minimum of 200 hours, total flying time.

## AERIAL NAVIGATION AND METEOROLOGY

By CAPT. LEWIS B. YANCEY

"AERIAL Navigation and Meteorology" by Capt. Lewis B. Yancey is a practical manual for pilots, students and for reference work on the problems of navigation, in which the use of technical terms and discussion has been reduced wherever possible. The volume discusses bearing and direction, terrestrial sphere, charts and maps, the compass, compass errors, compass and compensation, correction of courses, cross-country work, meteorology, first aid, and air commerce regulations; with appendices including a course error table, conversion table, statute to nautical miles, questions for review, and variation map of North America.

Capt. Yancey's purpose in this work is explained by him in the following statement. "There seem to be few books written by experienced navigators in such simple language that the average man might understand and appreciate the information given. Most publications on navigation are either far too advanced, or else contain historical and personal, instead of practical, reminiscences.

"It has been the writer's object to produce a book from which the man of average education may obtain a good working knowledge of the elements of navigation and meteorology. It is hoped that the practical and useful information contained will add something to the comfort, efficiency and safety of those who choose aviation for a career."

## REVISED AIRCRAFT A. T. C. REGULATIONS

THIRTY-EIGHT specific changes have been made by the Department of Commerce in the standards set for the approval of airplanes for Approved Type Certificates. To strengthen the construction of planes, the Department of Commerce will require manufacturers to demonstrate by tests the strength of all control surfaces and control systems and the shock absorbing qualities of the landing gears on their planes. All wood members used in airplane construction must now be tested to destruction and samples of the parts which fail must be tested to determine their physical properties.

Under terms of the new code, cabins must have one exit for every six persons carried instead of two exits as formerly. Detailed specifications for all openings and exits are given the manufacturers. Propeller clearance above the ground has been changed from a minimum of six inches to a minimum of nine inches on landplanes, and an 18-inch clearance has been specified for seaplanes. It is now required that propellers be so designed and adjusted that they will limit the engine speed at full throttle in level flight to 105 per cent of the official rated speed. The relative efficiency of biplane wings must be determined from rational formulae instead of from the curves formerly specified.

## RECENT APPROVED TYPE CERTIFICATES

Airplanes listed below have received Approved Type Certificates subsequent to those listed in the June, 1929, issue of AERO DIGEST, and are supplementary thereto:

Key: P—place; O—open; C—closed; L—landplane; Am—amphibion; Conv—convertible; Fb—flying boat; B—biplane, M—monoplane.

No.	Weight Empty	Useful Load	Gross Weight
140 Lockheed Vega, 5PCLM (Wright 300).....	2,140	1,713	3,853
141 Alexander A-13 3POLB (Challenger 170).....	1,705	945	2,650
142 Mahoney Ryan B-5, 6PCLM (Wright 300).....	2,251	1,749	4,000
143 Curtiss-Robin C-1, 3PCLM (Challenger 170).....	1,638	962	2,600
144 Curtiss-Robin C-2, 3PCLM (Challenger 170).....	1,667	933	2,600
145 Stinson SM-2 AA, 4PCLM (Wright 165).....	1,972	1,180	3,152
146 Travel Air B-4000, 3POLB (Wright 220).....	1,893	1,007	2,900
147 Travel Air BM-4000, 1POLB (Wright 220).....	1,928	1,072	3,000
148 Travel Air A-4000, 3POLB (Axelson 115).....	1,655	995	2,650
149 Travel Air C-4000, 3POLB (Challenger 170).....	1,590	1,007	2,597
150 Command-Aire 3C3, 2POLB (OX5-90).....	1,439	670	2,109
151 Command-Aire C3C-A, 2POLB (Warner 110).....	1,284	706	1,990
152 Laird LCR, 3POLB (Wright 220).....	1,848	970	2,818
153 Ireland SM-2 AB, 4PCLM (Wright 300).....	2,949	1,451	4,400
154 International F-17-W, 3POLB (Wright 220).....	1,780	920	2,700
155 International F-17-H, 3POLB (Hisco 150-180).....	1,755	951	2,706
156 Ford 5-AT-B, 17PCLM (3 P & W 450).....	7,576	5,674	13,250
157 Boeing 204, 6PCFbB (P&W 450).....	3,371	1,629	5,000
158 Sikorsky S-38-B, 12PCAmB (2 P&W 450).....	6,460	4,020	10,480
159 Curtiss-Thrush, 6PCLM (Challenger 170).....	2,232	1,468	3,700
160 Curtiss-Robertson Thrush, 6PCLM (Challenger 170).....	2,232	1,468	3,700
161 Simson SM-2 AB, 4PCLM (Wright 220).....	2,169	1,031	3,200
162 Kreider-Reisner C-4-C, 3POLB (Wright 165).....	1,457	885	2,342
163 Buhl CA3-D, 3PCLB (Wright 300).....	2,017	1,183	3,200
164 Fokker Standard Universal, 5PCLM (Wright 300).....	2,482	1,518	4,000
165 Ford 5-AT-C, 17PCLM (3 P&W 450).....	7,500	6,000	13,500
166 Bourdon B-4, 3POLB (Kinner 90).....	1,107	768	1,875
167 Great Lakes 2 T. 2POLB (Cirrus III 85).....	1,002	578	1,580
168 Waco 165, 3POLB (Wright 165).....	1,529	956	2,485
169 Lockheed Vega, 6PCLM (P&W 450).....	2,845	1,568	4,033
170 Kreutzer K-3, 6PCLM (3 LeBlond 90).....	2,486	1,654	4,500
171 Kreutzer K-2, 6PCLM (3 LeBlond 2-60, 1-90).....	2,697	1,748	4,445



# FULL 100 HORSEPOWER

**KINNER**  
AIRPLANE AND  
MOTOR CORP.  
GLENDALE, CALIF.





# **This KINNER Message is addressed to Manufacturers of 4 and 6 Place Planes**



**T**HE Kinner Five Cylinder 100 Horsepower Motor has proven its dependable performance. Now, thirty-five manufacturers of two and three place airplanes are powering their ships with Kinner Motors!

The same degree of dependable performance, that has made Kinner America's standard light plane power plant, is offered

to manufacturers of 4 and 6 place planes.

Three Kinner motors, developing a factory-guaranteed total of more than 300 horsepower affords a greater safety factor.. in emergency.. with sustained flight assured on two motors, while under the most remote possibility, one motor materially lengthens the gliding range!

**KINNER AIRPLANE AND MOTOR CORPORATION**

**GLENDAL**

**CALIFORNIA**



## LEADERSHIP

When the aviation industry was handicapped by the lack of proper insurance, it was the INDEPENDENCE COMPANIES of Philadelphia that first showed their faith in the future of the business by providing adequate protection against all aviation risks.

Since that date, three years ago, the leadership of these Companies in aviation insurance has been recognized by the entire aviation industry, and the leaders in the business, almost without exception, have become INDEPENDENCE policyholders. They realize the value of even three years of accumulated experience in this still new field of underwriting.

Now, the better to serve their old and new policyholders, these Companies have completed the organization of their own Home Office Underwriting Department. Mr. O. M. Doyle, formerly of Los Angeles—the best-known and most successful aviation underwriter of the Pacific Coast—is in charge. He and his assistants are fully qualified to act promptly on every aviation risk.

When in need of any kind of aviation insurance, it will be to your interest to look for the INDEPENDENCE agent or broker in your locality.

Visit the INDEPENDENCE BOOTH at the Cleveland Show. Learn of the new nation-wide insurance service of the Aviation Assurance Agents of America, an exclusive INDEPENDENCE organization.



# THE INDEPENDENCE COMPANIES

Independence Indemnity Company — Independence Fire Insurance Company

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THESE COMPANIES MAINTAIN HUMAN RELATIONS WITH THEIR AGENTS, BROKERS AND POLICYHOLDERS





Special Waco 220 Taper-Wing built for Mr. Julius Stone

**E**NTRIES in the Daniel Guggenheim Safe Aircraft Competition being held at Roosevelt Field, Long Island, will close September 1, according to an announcement of officers of the organization. This action was taken by the Fund because, in its opinion, sufficient entries have been received to give a reasonable prospect that the object of the competition will be achieved. There are 16 accepted entries in the competition.

## MANUFACTURERS REPORT PROFITS

**T**HREE of the largest aircraft engine manufacturers in the United States, Wright Aeronautical Corporation, Curtiss Aeroplane and Motor Company and the Pratt and Whitney Aircraft Company, reported net profits for the first three months of 1929 aggregating \$2,220,436. The total gross sales of the latter two firms amounted to \$5,183,076 for the same period.

The books of the Wright Aeronautical showed a net profit for the first quarter of 1929 of \$533,925. Total sales of the Curtiss Aeroplane and Motor Company amounted to \$1,433,509, the net profit for the three months being \$386,237. The Pratt and Whitney Aircraft Company reported total sales of \$3,749,567 for the period, with net profits of \$1,300,274.

## MODERN AVIATION ENGINES

[By MAJOR VICTOR W. PAGE]

**"M**ODERN Aviation Engines" is a treatise in two volumes concerning engines used on aircraft throughout the world. These volumes contain forty-six chapters describing the various American, English, French, German and Italian aeronautical engines. The text considers principles of operation, elementary thermo-dynamics, design and construction of all engine parts and their relation in the assembly. It tells why certain constructions are favored and shows why airplane engines work as they do, how they are installed, serviced, repaired in the shop and operated in flight. It outlines materials of construction, and considers metals and special alloys for various

uses. This treatise was prepared with the cooperation of the Army and Navy authorities and leading commercial airplane and engine constructors. Each chapter is followed by questions for review.

### Report of North American Aviation

**N**ORTH AMERICAN AVIATION, INC., recently issued its first semi-annual report. The statement shows a total income of \$1,436,306, of which \$867,916 was in the form of interest and dividends, \$342,664 profit on securities sold, and \$225,726 profit of subsidiaries. Total expenses for the period totaled \$110,185, leaving a net income of \$1,326,121 before federal taxes. After deducting \$154,040 reserves for taxes the company reported a net income of \$1,172,080 for the period.

## NATIONAL AIR SHOW IN ST. LOUIS

**T**HE 1930 National Aircraft Exposition of the Aeronautical Chamber of Commerce will be held in St. Louis next February, according to a recent decision of the Show Committee of the Aeronautical Chamber at New York. The selection of St. Louis was made after a consideration of offers from several cities who were seeking the exposition.

The 1930 show will be held in the buildings now being erected by the National Exhibition Company on a site adjacent to Forest Park. The buildings are being constructed at a cost of \$3,000,000. The buildings consist of two units of 86,000 square feet each and a covered arena located between them with 31,500 square feet of space available for booth displays. One side of the buildings is equipped with hangar doors to permit the entrance of planes without the necessity of disassembling them.

Immediately adjacent to the buildings is a landing field located in Forest Park, which is sufficiently large to permit planes destined for exhibition purposes to land without the necessity of dismantling. Planes will be taxied directly across the street into the building and placed on display.

The buildings are located within thirty minutes of the business section of St. Louis

and in the center of the residential section of the city.

The location of the air show in St. Louis is the culmination of more than a year's work by the Air Board of the St. Louis Chamber of Commerce in cooperation with the Industrial Club of St. Louis, represented through the efforts of Harold M. Bixby, former chairman of the Board of the Chamber and now president of the Industrial Club.

## T. A. T. AIR-RAIL PREPARATION COSTS

**T**OTAL expenditures made by the Transcontinental Air Transport in preparation for its coast to coast air-rail service exceeded three million dollars during the fourteen months preceding operations, according to a recent announcement of T.A.T. officials. The total is made up of field purchase and preparation, weather bureau installation, lighting of the airway, installation of radio and teletype communication systems, and construction of passenger stations.

The chief item of interest in the records is the amount of ground preparation necessary before operations were permitted. At the seven fields purchased outright or leased by the company, a total of \$253,200 was expended in surveys, purchases, leases and runway preparation. The figure does not include the erection and equipment of passenger stations, hangars and shops. For those buildings the records show an expenditure of approximately one-half million dollars. In addition, stations were erected from municipal funds at Columbus and Kansas City.

Construction and equipment for buildings used in the operation of T.A.T. weather bureau, including instruments, office installations and communications are shown in the records to have cost about \$50,000, an average of \$5,000 for each meteorological bureau and the off-line observation stations which report to it. The cost of radio buildings, towers and operating equipment for the seven stations of the airway communication system erected by T.A.T. is shown at \$169,000. The four airway radio stations at St. Louis, Kansas City, Wichita and Los Angeles erected by the U. S. Department of Commerce cost approximately \$95,000 additional.

In the automotive records appear eight tractors, eleven gasoline refueling trucks, thirteen Aero cars with power units, eleven Ford passenger cars and eleven Ford trucks. Cost of the automotive equipment is carried at \$126,795.

Much of the airway on the western division and all T.A.T. airports have been lighted with beacons, obstruction, ceiling, boundary and runway lights in preparation for night flying, which is planned for the near future, and to care for emergency night landings. Cost of the lighting installations is shown as \$156,000 for the airway and \$142,000 for the fields. Shop equipment at the two terminals, Columbus and Los Angeles, including tools and apparatus at the intermediate fields, is on the records as \$38,000.

(Continued on next page)

# The Inspector Has no Favorites



When a flying school student completes his course of instruction the next step is a final examination by an inspector of the Department of Commerce. This examination includes written tests, but most important . . . flight.

The flight examination may take one of two forms, or both. The inspector will prescribe certain maneuvers to be executed by the student in the air at certain altitudes, and the inspector will watch from the ground. Or the inspector will mount to the front cock-pit of the dual controlled plane to learn by "feel" the degree of control which the student has acquired.

The examination will more than likely take the latter form, but in any event it will fully test the student-pilot. He has reached a point where his instructor can be of no assistance. He must have developed his talent, his self-possession, his flying sense. He must prove himself the master of an airplane to the thorough satisfaction of the inspector . . . or take additional training at additional expense. And the result depends entirely upon the student's training . . . for the inspector has no favorites.

Spartan training makes no particular effort to prepare the pilot for any certain test. But the training program is balanced and applied in order to develop pilots who are alert, dependable and of outstanding ability. For Spartan's aim is not to graduate men just good enough to qualify for a license . . . but to produce pilots far superior to the average . . . pilots who are capable of taking their places in commercial aviation as specialists.

## SPARTAN SCHOOL OF AERONAUTICS TULSA • • OKLA.

FOR COMPLETE INFORMATION USE THE COUPON BELOW

Registrar, Spartan School  
of Aeronautics, Municipal  
Airport, Tulsa, Oklahoma.  
Please send me descriptive  
literature checked:

☐ 32-page illustrated school booklet . . .  
"Training that Produces Natural Pilots."

☐ How I may make use of the Spartan  
extended tuition payment plan.

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CITY \_\_\_\_\_ STATE \_\_\_\_\_



(Continued from preceding page)

The largest item appearing on the records is for planes and spare parts. The total cost of the ten transport planes, two smaller planes for company use, sixteen extra motors and spare parts, appears on the records as \$813,000. This cost, however, does not include the two-way radio equipment carried on each plane which is estimated at \$3,000 for each plane.

## SCHEDULE OF COMING AERONAUTIC EVENTS

August 24-September 2. National Air Races and Aeronautical Exposition, Cleveland, Ohio.

August 26-28. Soc. of Automotive Engineers Aeronautic Meeting, Cleveland.

August 31. Air Races, Syracuse, N. Y.

September 1-2. Pacific Coast Glider meet, Pacific Beach, San Diego, Calif. Sponsored by Pacific Beach Business Men's Ass'n. and San Diego Glider Club.

September 2. Altoona, Pa., Air Races.

September 6-7. Schneider Cup Race, over the Solent, Cowes, England.

September 7-15. Aircraft Exhibit of 1929 at Coliseum, Chicago, Ill.

September 7. Official opening of American Legion Airport near Connellsville, Texas.

September 7-8. Dedication of the airport at Amarillo, Texas.

September 9-14. Fair and Air Show, Muskegon, Mich.

September 10-20. Aero Club of France meeting, Le Baule, France.

September 11-12. Official opening of the airport at Big Springs, Texas.

September 15-21. Aviation Meet Sioux Falls, So. Dak.

September 15-21. Eastern States Exposition, Springfield, Mass.

September 28. Gordon Bennett Balloon Trophy Race, Laclede Gas Co. property, 8900 South Broadway, St. Louis, Mo.

October 5-21. National Air Tour for The Edsel Ford trophy.

October 12. Air Races, Salem, N. H.

October 29-November 22. World Engineering Congress, Tokio, Japan.

October 31. Guggenheim Safe Aircraft Competition closes.

November 9-16. Aeronautic Exposition, California Aircraft Exposition Association, Los Angeles, Calif.

February 7-15. Second Annual New York Aviation Show, Aviators Post No. 743, American Legion, New York City, N. Y.

April 5-13. Third All-American Aircraft Show, Detroit Board of Commerce, Detroit, Mich.

May 3-10. New York Aircraft Show, Aeronautical Chamber of Commerce, Madison Square Garden, New York City, N. Y.

# TEXAS AERO CORPORATION

By CAPT. W. H. SCOTT

THE Texas Aero Corporation of Dallas, until recently at Temple, Texas, has been re-financed and is in the process of building a plant at Love Field, Dallas, where it will develop and build four models of Temple monoplanes. These models will include a two-place open sport and training plane and a two-place closed sport and training plane, powered with a Cirrus Mark III, LeBlond 90, or any engine under 165 horsepower. A Wright J-6 powered mail ship to be produced will be convertible into a three-place sport or cotton dusting plane. The largest ship will be an eight-place Wasp-powered open cockpit cabin ship that can be adapted to fast freight carrying work.

The company has purchased a four acre site adjoining Love Field on which the factory building is being built. Factory production of the new ships calls for the building of eleven planes per month for the first three months of operation, after which it is expected that the number of the various types will be increased.

The officers of the company—George W. Williams, president; George Carroll, vice-president; Roy Sanderford, secretary, treas-

urer; and E. K. Williams, chairman of the board of directors—are in charge of operations under the new organization. Officers of the technical and advisory board are C. L. Offenstein, formerly chief engineer of the Department of Commerce; Tom Hardin, vice-president of the Texas Air Transport; and George Carroll, who has been with the company for the past twelve years. Among the directors of the company are A. H. Curry, general manager Charles M. Campbell, Charles G. Jester, R. E. Shapell, Alvin M. Owsley, E. K. Williams, Sam Sparkes, and Senator Walter C. Woodward.

The Temple Aero Corporation was the first firm to start an airplane factory in Texas, having been in business since 1910, specializing in cabin passenger transports and night flying airmail planes. George W. Williams, Jr. is designer of all models of the Temple monoplanes. He built and flew his first model in 1910, after two years of experiments. In an interview for AERO DIGEST Mr. Williams said that from the very first of his experiments he has been confident that the monoplane was the most practical type of commercial ship.

## NEW YORK-BUENOS AIRES AIRLINE

EIGHT thousand miles of Atlantic coastline, including the greater part of the Eastern seaboard of the United States and South America will be joined by a single airline in December, when the New York, Rio and Buenos Aires Lines, Inc., opens its line from New York City to Buenos Aires, Argentina. This service will shorten to seven days the 21 days required by steamships between the North and South American terminals.

Flying by day in 20-passenger twin-engined Consolidated Commodore flying boats, the planes of the New York, Rio and Buenos Aires Line will follow the line of the steamship traffic lane between the North and South American continents. Out of New York City, the stops on the first day's flight will include Baltimore, Washington, Norfolk, Wilmington, Charleston, Savannah, Jacksonville, and Tampa, a distance of 1,180 miles. The following day the first stop will be Havana. The distance from Miami to Havana is ninety miles, and will be the longest over-water flight of the entire journey. The route will skirt the southern coast of Cuba, stops being made at Cienfuegos, Camaguey and Santiago. From Santiago the flight will be almost due east, over the Windward Passage to Haiti and Port-au-Prince.

The third morning the plane will head along the south shore of Haiti, to Santo Domingo, capital of the Dominican Republic, and thence over Mona Island to Porto Rico with its sugar plantations, where a stop will be made at San Juan. Out of San Juan the ship will fly over the Virgin Islands to St. Martin's and St. Kitts Islands, past Montserrat, to Basse Terre, the principle city of the island of Guadeloupe. Following a short stop, the flight over the Leeward

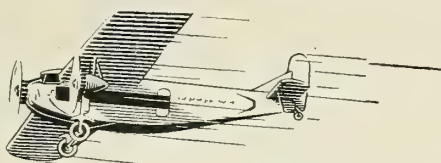
Islands will be continued, over Dominica to Fort de France, center of Martinique. Then the Windward Islands, consisting of St. Lucia, St. Vincent, the Grenadines, and then Trinidad, where a stop will be made for the night at Port of Spain.

On the fourth morning of the flight the plane will pass the delta of the Orinoco River, along the shore line of Venezuela, and thence to Georgetown, in the British Guianas. In quick succession will follow the city of Paramaribo, in Dutch Guiana; French Guiana, Devil's Island, the French penal colony, to land at Cayenne. Leaving Cayenne the plane is to cross into Brazil, and after two hours and a half the mouth of the Amazon River will be reached. Then the plane will turn inland a short distance and fly across the delta, across the island of Marajo to Para, where the fourth day's flight ends.

From Para the voyage will be continued almost due east, along the northern coast of Brazil, passing Sao Luis and Fortaleza, and coming down for a landing at Natal. Past Parahiba, the night is to be spent in Pernambuco. For the last two days, 2,530 miles of flying will remain. Out of Pernambuco the plane will fly past Maceio, Aracaju, Bahia, Carabello, Victoria, Campos and into Rio de Janeiro for the night. The seventh day will find the plane stopping at Santos, Paranagua, Florianapolis, Porto Alegre, Pelotas, Montevideo and, completing the more than 8,000 miles from New York City to Buenos Aires.

On this seven-day flight the plane will carry mail, passengers and freight. The New York, Rio & Buenos Aires Line, Inc., holds an exclusive airmail contract with the Argentine Government and Uruguay for the

(Continued on next page)



*Are rains  
flooding  
your  
landing  
field?*



*Always - your field can be drained and safe  
with flexible pipe... it cannot break!*

**I**NVESTIGATION of recent cases of flooded landing fields has disclosed that the cause of the flooding often is a broken drain pipe. This is not surprising, if rigid drain pipe is used, for this type of drain cannot reasonably be expected to withstand the conditions encountered in airport construction and operation.

How can these expensive replacements be avoided? By the use of Armco Perforated Iron Pipe, which easily withstands these severe conditions—because it is corrugated and flexible.

The rock backfill should be carried to the



surface to provide *rapid* surface drainage. With Armco Perforated Pipe this is feasible because the rock backfill can be dumped directly onto it without injury. Nor is it damaged by impact from trucks, rollers or landing planes. Even freezing water cannot burst or shatter this rugged pipe.

Avoid costly drain replacements and maintenance. Officials and executives, who are finding ordinary drainage systems will not stand up under airport service, should investigate rugged Armco Perforated Pipe. Your name and address brings the facts.

Armco culverts and drains are manufactured from the Armco Ingot Iron of The American Rolling Mill Company and always bear its brand

ARMCO CULVERT MANUFACTURERS ASSOCIATION, Middletown, Ohio

**ARMCO** perforated **PIPE**

*Use flexible pipe—it cannot break*

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(Continued from preceding page)

transportation of all mail from those countries to the United States, until the amount shall have reached twenty-five per cent of the countries' total mail of all classes. This mail will be carried, according to the contract, at ten dollars, in Argentine money, per pound. On each day a different plane will fly over one day's section of the route. The passenger, mail and freight planes are powered by two Pratt and Whitney radial, air-cooled engines of 440 horsepower each.

The board of directors of the New York, Rio and Buenos Aires Lines company include Captain Ralph A. O'Neill, Thomas E. Bragg, Franklin Q. Brown, George D. Buckley, Richard B. Bevier, Alejandro E. Bunge, Edward H. Clark, R. H. Fleet, Robert L. Hague, Loring R. Hoover, Seymour H. Knox, William B. Mayo, John K. Montgomery, Frank C. Munson, James R. Rand, Jr., George A. Rentschler, J. E. Reynolds, Paul Schoellkopf, and Arthur P. Stemm. In addition, Captain O'Neill has as his assistant Wilson F. Reynolds as secretary and assistant general manager, and Lewis E. Pierson, Jr., assistant to the president.

Captain O'Neill returned to New York City only recently after an extended survey trip of several months, during which time he flew the entire route southward from New York City to Buenos Aires in the *Washington*, the flagship of the company's fleet of planes.

## AVIATION: ITS COMMERCIAL AND FINANCIAL ASPECTS

By RICHARD REA BENNETT

(Published by the Ronald Press Company)

"THE purpose of this book," says Mr. Richard R. Bennett in the preface to *Aviation: Its Commercial and Financial Aspects*, "is to outline and explain the financial and commercial problems of aviation which daily confront the layman, the banker, the investor, the economist, the educator, the lawyer, the engineer, the scientist, the college student, the business, advertising and insurance man, and the transportation and public utility engineer."

Mr. Bennett shows how the present policies of the Government, together with the popular interest in aviation, have achieved a remarkably rapid development in aeronautics within a few years.

The book attempts an appraisal of the present status of commercial aeronautics particularly as it has to do with the future expansion of the industry and its position in the business and financial world. It presents intelligibly a mass of figures showing the substantial development and present financial backing of aviation. Mr. Bennett wisely advises that careful investigation should precede investment.

A volume of this character is particularly appropriate at this time because of the increasing lay and business interest in the growth of aviation. Although the book is of greatest importance to those not directly engaged in aeronautical enterprise, it ought

also to prove an interesting document to the aeronautical man who seeks a comprehensive survey of the present financial and commercial position of aviation in the realm of big business.

## TRADE LITERATURE

### Booklet on the Caterpillar Tractor Co.

"A WALL Ten Miles High" is the title of a 20-page booklet recently published by the Caterpillar Tractor Company, describing the efficiency of Caterpillar tractors for clearing airports of snow. The publication is illustrated with effective photographs of the tractors at work in the winter. The text compares one foot of snow on an airfield to a wall ten miles high in its ability to make flying dangerous, and to retard schedules.

### B. B. T. Booklet "Safe Airport Lighting"

THE B. B. T. Corporation of America, with offices in Philadelphia, recently published a 16-page booklet and catalogue entitled "Safe Airport Lighting." The catalogue discusses requirements of airport lighting for night flying, explains the principles of various lights now used, and shows the characteristics of B. B. T. lights for fulfilling these requirements. The booklet is designed for all who are interested in the improvement of airport lighting facilities.

EUGENE R. WHITE, Superintendent of the Division of International Postage, returned to Washington recently to report the work of the Universal Postage Congress at London, which he attended as the delegate of the United States. Eighty nations were represented by 250 delegates.

The Congress has agreed to continue temporarily the regulations adopted two years ago at the Hague Conference concerning international air mail handling and rates. Under the Hague agreement, each country affiliated with the Universal Postage Union is required to place its own air mail service at the disposal of all other countries on equal terms.

## AIR PIONEERING IN THE ARCTIC

REVIEWED BY HARRY W. FRANTZ

THE air heroes are writing their own history. Unlike their marine predecessors, the captains and navigators of today are not entrusting their fame to the hazards of random chroniclers of the future, but in press, magazine, and in book are hastening to preserve their own imperishable records.

"Air Pioneering in the Arctic," published by the National American Society, of New York, is fine evidence of the desire of modern air explorers to "make the record straight" in their own generation. The book describes the two Polar flights of Amundsen and Ellsworth, and through completeness of text and beauty of illustration, is a worthy memorial to the great Norwegian explorer, lost in the ill-fated search for Nobile.

The book deals with the 1925 flight of the N-24 and the N-25 to 88 degrees North; and with the crossing of the Polar Sea by the *Norge* in 1926. Richard Ellsworth, in "An Epic of the Polar Air Lanes," tells of the flight of the airplanes from Spitzbergen to a point less than 150 miles from the North Pole, of the forced descent, of the arduous adventures on the ice-pack for twenty-five days, and of the almost unbelievable escape in the N-25.

To the narrative texts are added complete technical information concerning navigation, weather, and equipment; and such interesting illustrations as the diplomatic agreements relating to the flight and an urgent press dispatch filed from the *Norge* May 12, 1926, at 1 a. m., as the dirigible reached the Pole.

"Air Pioneering in the Arctic" concludes with Ellsworth's personal tribute to his air-comrade, Roald Amundsen, which fittingly suggests the valiant mood of the first explorer to navigate the Northwest Passage, first to reach the South Pole, and first to cross the North Polar Sea by dirigible.

### Russian Plane Flying to U. S.

FOUR Russian fliers in an all-metal bi-motored monoplane took off for New York from Moscow on August 8, planning to reach this country in forty days. The flight is being made by way of Siberia and Alaska. The plane, which is of Soviet manufacture, is named the *Land of the Soviets*. It will fly 7,500 miles over land and 5,000 miles over water.

## NEW YORK

A NEW method for extinguishing the flames of burning gasoline was demonstrated at Roosevelt Field, Mineola, L. I., recently by the Du Gas Fire Extinguishing Corporation of New York City.

The Du Gas fire extinguisher is a new type of dry chemical apparatus by which a protecting shield of dry powder is forced out under pressure in a spray that quenches flames and permits the operator to get close to a fire. One important advantage claimed for dry chemical fire apparatus is that it is easily cleaned up after use and does not injure materials. It is effective on fires of lacquer, pyroxylin, alcohol, etc. The chemical is non-freezing and non-injurious. Officials at Roosevelt Field have approved Du Gas equipment for use on their recently installed emergency wagon.

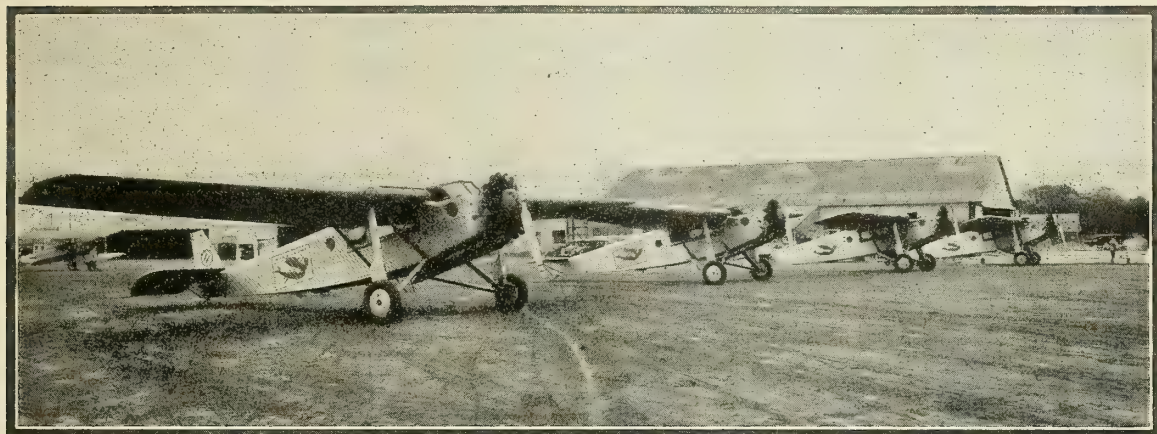
The Aircraft Distributors Corporation, Kansas City, Mo., is the sole agent for Du Gas equipment for the aviation industry.

APPLICATION has been made for the entry of the Gates RSV mono-biplane, a combined sport and training plane, in the Guggenheim Safe Aircraft Competition, according to an announcement made recently by officers of the Gates Aircraft Corporation, American manufacturers of the plane. The RSV, which can be changed from biplane to monoplane within two hours, was designed

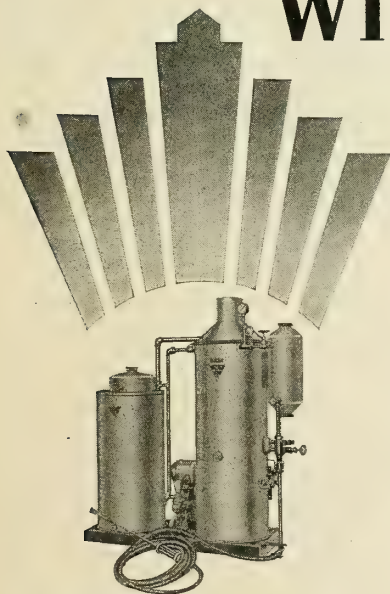
(Continued on next page)

# TRIDEX

*for Airplane Cleaning*



## KEEPING A FLEET SHIP-SHAPE WITH THE NEW TRIDEX



The New TRIDEX Model G cleaning unit, designed particularly for the cleaning of airplanes and airplane motors.

TRIDEX is the only scientific cleaning machine on the market. FIRST to introduce the use of water warmed, softened and properly mixed with soap BY THE MACHINE. FIRST to produce a spray controlled, regulated and designed precisely for the purpose—to melt off or dissolve grease and dirt.

Cleaning is done scientifically, not by hydraulic force, for the TRIDEX spray is applied with moderate pressure.

Universal Air Lines (Braniff Division), operating passenger planes of various types to many points in the Southwest, has adopted the new TRIDEX Model G cleaning unit for keeping a fleet of planes clean and attractive. Universal has found that TRIDEX cleans a plane in one-third the time required by other methods, that the cost is reduced by more than 50 per cent over old systems and that TRIDEX is the only unit adapted to cleaning planes of either metal or fabric surfaces.

Pilots report that the use of TRIDEX in cleaning air-cooled, radial motors increases the efficiency of the motor because TRIDEX removes all grease, dirt and film, thus helping the motor to throw off excess heat. Grease, mud and discolorations on undercarriage, fuselage and wings on planes of either metal or fabric coverings are quickly removed by TRIDEX without any injury whatsoever to the surface.

The photograph reproduced above shows a portion of the Universal-Braniff fleet of passenger planes lined up at the Oklahoma City airport. The average time required in cleaning one of these ships with the TRIDEX Model G unit is 45 minutes, as compared with more than two hours with other systems.

Flying schools, mail contracting routes and passenger carrying lines have found the TRIDEX cleaning unit to be the one practical method for rapid, automatic cleaning of airplanes. Airports are installing TRIDEX as a service convenience to airplane owners for TRIDEX has made it possible to clean a plane in less time and as cheaply as to wash an automobile.

For complete information concerning prices and operation costs use the coupon.

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Box 1106, Dallas, Texas.

Gentlemen: Please mail me, without obligation, full information and prices on your Tridex Cleaning Unit.

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R. R. Safford Company, Exclusive Southwestern Distributors, P. O. Box 931, Dallas, Texas.



(New York News continued)

At present the concern is concentrating on two sizes of open and closed ships, designed for 200 horsepower and 300 to 400 horsepower engines. The company has orders entailing capacity production for the next three months. According to Lloyd Stearman, president of the concern, the Stearman Aircraft Company will be operated as a unit of the United Aircraft group without any change in personnel.

The new Northrup Aviation Corporation will take over the assets of the Avian Corporation of Los Angeles, California. The Avian Corporation was organized a year ago and has been engaged in airplane designing. United Aircraft plans to construct a factory on its airport at Burbank Field, Los Angeles, where the Northrup concern can develop and improve the work of the Avian Corporation by experimentation.

**T**HE Travel Air Manufacturing Company of Wichita, Kansas, was acquired recently by the Curtiss-Wright Corporation. The Travel Air firm is the twelfth organization to be taken into the Curtiss-Wright group.

Travel Air has 116 dealers and distributors, with a nation-wide distribution and foreign representation in practically every country. The sales of the Travel Air Company for the first six months of 1929 are reported as being approximately equal to the total sales for the entire year of 1928.

#### Baum Building Sikorsky Hulls

**SEYMOUR J. BAUM**, president of Seymour J. Baum, Inc., reports that his firm is in production on an order of 60 amphibion hulls for the Sikorsky Manufacturing Company. The first deliveries on the contract were made August 15th. Three hulls per week will be delivered until completion of the order of 60.

Although the factory of Seymour J. Baum, Inc., was opened less than three months ago, it has been producing many metal aircraft specialties, including aluminum air message writing boards for the U. S. Army Air Service; airplane fittings for Gates Aircraft Co.; tail skids and landing gears; experimental parts for Pratt and Whitney Aircraft Co., including a special air cleaner and water cooler for the Apache plane which holds the American altitude record; and skis for the Pursuit Group of Selfridge Field.

Aluminum gasoline and oil tanks have been fabricated for several airplane builders including the Loening Aeronautical Corporation. The Sikorsky amphibion hulls are being built by a continuous production line of ten hulls, which permits a division of labor and inspection, and promotes speed efficiency and lower man hour costs.

**T**HE Chagnkart International Aviation Company, with offices in New York City, was formed recently to manufacture airplanes. The officers of the firm are Gustavus A. Rogers, president; Edmond Chagniard and Alexander Kartveli, vice presidents; and Mrs. Dorothy Daner, secretary and treasurer.

The company intends to build a two seater sport monoplane, which can be easily converted into a seaplane. This machine is of

cantilever design with double tapered wings, both wing and fuselage being of metal construction, including the covering.

The activity of the engineering department will be directed to the design of a commercial airplane intended for transatlantic air service. The plane is designed to carry 50 passengers, besides a crew of 10. The passenger cabin contains all modern equipment and is to be built entirely of metal.

#### Cunningham-Hall Receives Approval

**A**PPROVED Type Certificate No. 177 was issued recently by the Department of Commerce for the Cunningham-Hall PT-6 six-place biplane, manufactured by the Cunningham-Hall Aircraft Corporation of Rochester, N. Y. The PT-6 is of all-metal structure with a metal-covered cabin. It is powered with a Wright Whirlwind Nine of 320 horsepower, and has a high speed of 136 miles per hour, with a cruising speed of 115. The Cunningham-Hall plane was described in the May, 1929, issue of AERO DIGEST.

**PITCAIRN AVIATION, INC.**, operating the Atlanta-New York and Atlanta-Tampa-Miami air mail lines, is now located in Brooklyn, N. Y., following the recent sale of the company to North American Aviation, Inc.

**GATES FLYING SERVICE, INC.**, of Jackson Heights, L. I., is advertising by means of a sign suspended by several kites above Holmes Airport, Jackson Heights. The device was recently constructed by Lieutenant Edgar C. Finley.

**T**HE Aviation Engineering School, with executive offices and school located in New York City, recently completed a successful term with a graduating class of one hundred and twenty-eight students. The majority finished the course in airplane and engine mechanics, others graduated from the drafting and designing courses and several from flying.

**L. C. SIMPSON** was recently appointed manager of the newly created aeronautical lighting department of the Curtiss Flying Service, according to C. S. Jones, president. This unit of the Curtiss Flying Service will sell a full line of lighting equipment for airports, airways and aircraft.

Mr. Simpson is a graduate electrical engineer of the University of Colorado who has devoted himself for several years to the problems of aviation lighting. He has recently been an airport lighting specialist for the Westinghouse Electric and Manufacturing Company.

**T**HE Faircam Realty Corporation, a subsidiary of the Fairchild Aviation Corporation, recently purchased three acres of property in Farmingdale, Long Island, adjacent to the present Fairchild manufacturing plant. On this property is a building covering 41,761 square feet, and to it is being added a bay of brick and steel construction measuring 240 by 70 feet and giving a total addition of 16,800 square feet.

The roof girders are now in place and the walls are rising rapidly. The work is being done under the direction of John G. Gaukat, plant engineer of the company.

This entire building will be known as the Design and Development Division of the Fairchild Airplane Manufacturing Corporation. It will house the staff of sixty-five engineers now in the employ of the company, and will contain the service department and the pontoon division of the company. The above acquisition gives Fairchild a total floor space of over 220,000 square feet.

**T**HE Allied Aviation Industries, Inc., recently announced the purchase of Royal Airways, Inc., of Madison, Wisconsin, which owns and operates an airport of about 450 acres four miles from Madison. Royal Airways will distribute the products of Allied Aviation Industries, Inc., including planes and aircraft accessories, and its aviation school will be enlarged.

**A** SET of aerial photographs taken from 20,000 feet and showing all of the 125-mile length of Long Island, has just been completed by photographers of the Fairchild Aerial Surveys, Inc. The photographs are reported to be the highest ever taken over New York City, and because of a strong northeast wind which was blowing at the time, the visibility of details is good. The pictures were made by Robert A. Smith, of the Fairchild company, and H. H. Hunter, of Roosevelt Field, Inc., the pilot of the Fairchild monoplane used in the work.

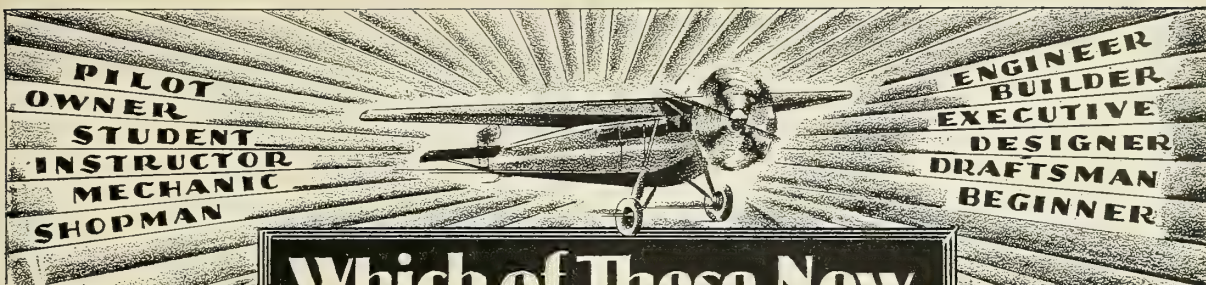
**A. K. RAPELJE** has become regional zone manager of the Fairchild Aviation Corporation for Chicago, Illinois, effective August 1st. He is assisted by R. H. Lasche, S. A. Pierson, E. N. Townsend and H. K. Weld, who will serve in the capacity of pilot sales representatives.

**T**HE Pioneer Instrument Company of Brooklyn has sold more flight and navigation instruments in the first six months of 1929 than were sold during the entire year of 1927, according to Charles H. Colvin, general manager of the company. The statement released by Mr. Colvin shows that the first quarter of this year grossed a larger return in sales than the first five months of 1928, while records for the month of March show that thirty per cent more shipments were made during that period than during any other month in the company's history.

Following is a statement of gross sales: 1927, \$550,000; 1928, \$940,000; 1929 (estimated), \$1,400,000. Pioneer was acquired recently by the Bendix Aviation Corporation. Branches of the organization have been established in Washington, San Francisco, Los Angeles, Chicago and Wichita in this country. Foreign branches are located in Paris, Milan, Berlin, Amsterdam, Madrid, Tokio, Bangkok, Rio de Janeiro and Toronto. Plant facilities have already increased fifty per cent this year and another unit is under construction.

(Continued on next page)





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By Major V. W. Pagé  
Air Corps, U. S. R.

"ONE THOUSAND DOLLARS' worth of aeronautical information for the small sum of five dollars," says Thomas L. Hill, Pres. Am. Society for Promotion of Aviation, Inc., of this comprehensive treatise that covers all phases of aeronautics. Written by an internationally known automotive engineering authority, it answers every question about the design, construction, operation and maintenance of all types of American and foreign airships, airplanes and engines. Used as a reference and text book in more than two hundred aviation schools. Invaluable to pilots, mechanics, officials.

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160 Pages, 150 Illustrations

## ABC of Aviation

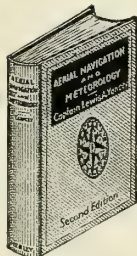
By Major Victor W. Pagé

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## Aerial Navigation and Meteorology

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Navigator of the Pathfinder on its Historic Flight to Rome.



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JUST off the press, this second revised and much enlarged edition of Yancey's monumental work will be welcomed by aircraft pilots, students and everyone interested in the important subject of navigation. Written in simple non-technical language that the average man can understand, yet so comprehensive that it is indispensable to the transport pilot and to those preparing for transport pilot examinations.

The author, Capt. Lewis A. Yancey, famous transatlantic flyer, is a practical navigator with more than 15 years' experience, advisor to important long distance flights, lecturer, teacher. Here, in 350 pages of practical information, is the knowledge that will enable the pilot to fly his course with precision and assurance. Numerous problems are stated and solved and examples given for practice.

The chapter headings: Bearing and Direction—Terrestrial Sphere—Charts and Maps—The Compass—Compass Errors—Compass and Compensation—Correction of Courses, Cross-Country Work—Meteorology—First Aid—Air Commerce Regulations.

The Appendix contains Course Error Table, Conversion Table, Statute to Nautical Miles, Questions for Review, Variation Map of North America. Price—\$4.00.

## Everybody's Aviation Guide

By Major Victor W. Pagé

A PRACTICAL, non-technical book for the aviation enthusiast that teaches aviation from the beginning and gives complete information necessary for U. S. Government license. Meaty, concise, up-to-date, this popular book contains 600 Questions and Answers explaining the construction of airplanes and dirigibles and how they navigate the air. Among the contents are a brief history of aeronautics, description of various forms of aircraft, elementary aero-dynamics, airplane parts and their function, airplane fuselage forms and landing gears, airplane wing forms and construction, engine types, propellers, airplane equilibrium and control, official records. Price—\$2.00.



256 Pages  
140 Illustrations

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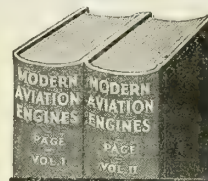
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## Modern Aviation Engines

By Major Victor W. Pagé

THE most complete treatise on all types of aircraft motors ever published. A gold mine of necessary information for flying schools, pilots, field mechanics, shop men, engineers, students, beginners—for everyone, everywhere in the aviation industry.

Based on practical shop and field experience, these two volumes are the result of five years intensive study by one of America's greatest authorities, with the cooperation of the Army and Navy authorities and leading commercial airplane and engine constructors. The text covers everything in the design, construction, installation, operation and repair of all leading American and foreign aeronautical engines. Each volume contains 1,000 pages and 500 illustrations. Volume One covers the principles of engines, elementary thermo-dynamics, engine parts and functions, fuels, carburetion, aircraft superchargers, Diesel engines, aviation ignition systems, magnetos, engine lubrication, aircraft cooling systems, cylinder construction, pre-war engines, wartime engines, trouble shooting, Liberty motors, etc.

Volume Two takes up the various types of engines in use with detailed descriptions of the leading makes such as the Wright "Whirlwind" and "Cyclone," the Pratt and Whitney "Wasp" and "Hornet," Anzani, Cirrus Mark II and III, Packard, Curtiss and Camenzair air and water-cooled types and their accessories. It also covers engine installation, instruments, propellers, reduction gears, starters, engine repair, dirigible airship engines, etc.

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NOTE: If you enclose remittance with this coupon, we will pay postage charges. Same 5-day return privilege. (Remittance must accompany orders from Canada or foreign countries.)



(New York News continued)

and is being manufactured in Europe by the firm of Stampe and Vertongen, whose factories are near Antwerp. Flown by John Stampe, it has won several European contests during the past few months, including the Belgian national air tour.

#### S-56 Tested by American Aeronautical

**T**HE first American manufactured Savoia-Marchetti was test flown recently at the seaplane base and factory of the American Aeronautical Corporation at Port Washington, L. I. This plane, known as the American Savoia-Marchetti S-56, is a three place training and sport amphibian powered by a 95 horsepower Kinner engine.

The new ship was built and assembled at the temporary plant of the American Aeronautical Corporation at Whitestone, L. I., where parts for twenty-five more of this type have been made and are ready for assembly. At the permanent factory at Port Washington, L. I., this company plans to turn out one of these ships a day. The American Aeronautical Corporation will occupy its new quarters about October 1st.

The S-56 is operated by two sets of controls placed side by side in the cockpit, the secondary set being easily disconnected in case of an emergency or taken out completely to allow greater space. There is a lever for raising or lowering the wheels located between the pilots' seats which can be operated by either pilot. This ship has a maximum speed of 98 miles per hour and a cruising speed of 85 miles per hour, and takes off from the water in ten seconds, and from the land within 300 feet.

**A**N evening course in Diesel and oil engines is being given by the Brooklyn Polytechnic Institute of Brooklyn, N. Y. The course consists of twenty lectures of two hours each and twenty periods in the laboratory and classroom. The lecturers are Julius Kuttner and Edgar J. Kates, consulting en-

gineers of New York. The laboratory and classroom work will be given by Professors Moore and Carvin of the Polytechnic Institute. An additional feature of the course will be two lectures on laboratory and fuel oils by C. V. Bacon, Chemical Engineer of New York City.

**T**HE United States Army Air Corps recently awarded a contract for 1140 Irvin air chutes, for delivery in six months, to the Irvin Air Chute Company. According to Col. L. J. Campbell, chairman of the board of the Irvin company, more than thirty foreign governments have adopted the Irvin air chute as standard equipment for their flying forces.

**D**AILY passenger flights between New York City and Saratoga and Lake George have been inaugurated by the Curtiss Flying Service, using Sikorsky amphibians. Special boats leave the foot of East 42nd Street, New York City, every day at 11:45, connecting with the North Beach airport and seaplane base, used in the amphibion service. The planes reach Saratoga at 1:30 p. m. and Lake George at 2:00 p. m. They leave the lake resort at 4:50, Saratoga after the last horse race at 5:30, and arrive in New York City at 7:00 p. m.

**MAJOR LESLIE MACDILL**, chief of the procurement section of the material division of the Air Corps and commanding officer of Wright Field, Dayton, Ohio, will join the staff of Air Stocks, Inc., it was recently announced by officers of the concern.

**T**HE Fairchild Aviation Corporation of Farmingdale, L. I., recently shipped six Fairchild cabin monoplanes to Santiago, where they will be used in the air mail service of the Chilean government.

**OFFICERS** of the Consolidated Instrument Company of America, Inc., New York City, recently reported two orders for aircraft equipment, from the Parks Air-

craft Company of East St. Louis, Mo., and the Cardinal Aircraft Company, aviation division of the St. Louis Car Company, St. Louis. The Parks company contracted for instrument boards for 500 planes and the Cardinal order called for complete aircraft instrument panels for 100 two-place monoplanes.

**A**FLYING yacht to be built in Germany at the Dornier Airplane Works was ordered recently by Mr. Garfield Wood, builder of speedboats. The new craft will be 84 feet long and 18 feet wide, propelled by four engines of 500 to 600 horsepower each, and will have a top speed of 140 miles an hour and a cruising speed of 120 miles an hour. The flying yacht will have room for twenty-four passengers. The regular crew will consist of a pilot, a mechanic, and a steward. The flying yacht will be equipped with an afterdeck eighteen feet long and eight feet wide, and a forward deck ten feet long and eight feet wide. These decks will be used when the flying yacht is on the water for lounging and open-air entertainment. The yacht will have four staterooms, will be equipped with hot and cold water, Frigidaire, shower baths, wireless and will carry a small lorry.

The flying boat, constructed of metal, will be called "Do-Car," and the type thereafter will be of that name. When it has met all the tests, the "Do-Car" will be shipped to New York next winter.

**A**NNOUNCEMENT was made recently by the Atlantic Coast Airways that Lieut. Zeus Soucek, navy airman, has been granted leave to become flight superintendent of the airline of the company between New York and Atlantic City. A permit has been granted the company, according to its president, T. Duncan Just, to use the Battery Park yacht basin as a New York terminal. A terminal at Atlantic City was provided by the reconditioning of former property of the Atlantic City Yacht Club. The terminal includes waiting rooms, offices, pilots' and mechanics' quarters, and restaurant.

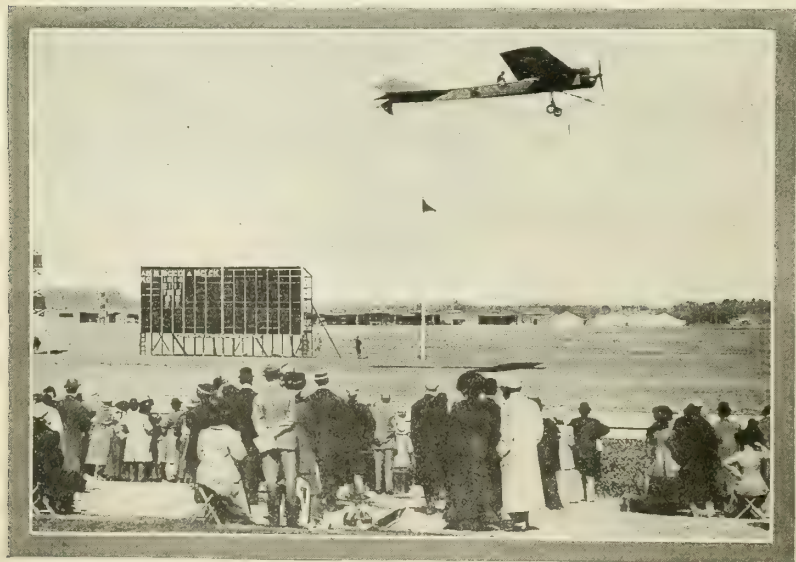
The company has six planes in operation, each equipped with Liberty modified twin motors and a capacity of 16 passengers. The trip to the New York landing station in Battery Park is made in one hour. The company also maintains a service station at Cape May where each plane is inspected every fifth day as a safety precaution.

Officers and directors of the Atlantic Coast Airways corporation include: T. Duncan Just, New York, president; Charles E. Wade, New York, vice president; E. Logan Hill, New York, vice president and traffic manager; Arthur Clay, Bloomsburg, Pa., treasurer; Gilbert Maxwell, New York, and Robert O. Cowan, of Philadelphia.

**F. B. RENTSCHLER**, president of the United Aircraft and Transport Corporation of New York City, recently announced the amalgamation of the Stearman Aircraft Company and the Northrup Aviation Corporation with United Aircraft interests.

The Stearman Aircraft Company will continue its manufacture of commercial planes.

(Continued on next page)



Count de Lessepe flying the Latham Antoinette in the International Bennett Cup Race held at Belmont Park, New York, in 1910



WHY DOES QUAKER  
STATE GIVE YOU  
SWEETER LUBRI-  
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THERE'S AN EXTRA  
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THE reason for the extra quart in every gallon of Quaker State Aero Oil is the reason why Quaker State gives the smoothest, sweetest lubrication that ever kept an airplane motor purring! And here's the reason . . .

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Ordinary refining leaves in every gallon of oil, a quart or more of material that has little or no value in lubricating a motor. It is a quart of waste.

But Quaker State is not refined in the ordinary way. It is *super*-refined—carried a step further than ordinary oils. And this “extra step” removes the quart of waste that ordinary refining leaves in. In its place you get a quart of *lubricant*—you get an *extra* quart in every gallon of Quaker State.

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QUAKER STATE MEDIUM MOTOR OIL  
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QUAKER STATE HEAVY MOTOR OIL  
QUAKER STATE TRACTOR OILS





(New York News continued)

**T**HE University of Buffalo, Buffalo, N. Y., has inaugurated an aeronautic ground school under the direction of Dean Clarence S. Marsh. Five courses varying from five to ten weeks in length and based on the Department of Commerce regulations will be given each year.

Students completing the limited commercial pilots' course will have 60 hours of classroom work and ten hours of coordinated shop practice. The transport pilots' course at Buffalo will include 115 hours of work. Three ground school courses are now offered, private pilots, limited commercial and transport. Forty-two hours work, required for the private pilot license, includes ten hours' instruction on airplanes, ten hours on airplane engines, five hours on rules and regulations, five hours on meteorology, two hours on parachute and compass, and ten hours on airports. For the limited commercial course, the same work is given with eight additional hours of radio and instrument communication, ten hours of navigation and ten hours of coordinated shop practice representing thirty actual hours of shop work. The transport pilots' course is increased by the addition of ten more hours of airplanes, ten hours of airplane engines, ten hours of meteorology, five hours of navigation and ten hours of coordinated shop practice.

**MALCOLM R. WHITE** was recently elected president of the American Airports Corporation. Mr. White is also associated with the Indian Head Corporation, Colonial Airways Corporation, Motorless Aviation Corporation, and Liberty Electric Corporation.

## BINGHAMTON

[JOHN B. G. BABCOCK]

**F. TRUBEE DAVISON**, Assistant Secretary of War for aviation, was a guest of honor and one of the principal speakers at the annual New York Mayors' Conference and quarterly meeting of the New York State Aviation Conference, held at Binghamton, N. Y., recently.

Mayor Charles G. Hanna of Syracuse, president of the New York State Aviation Conference, was re-elected president of the conference, following adoption of a constitution and by-laws. The other officers were also re-elected. The new constitution provides that the conference shall consist of 10 mayors, 10 Chamber of Commerce secretaries, and 5 members each from the New York State Association of Real Estate Boards, Aeronautical Association, and American Legion.

**I**NCORPORATION papers have been filed for the Binghamton Flying Service, Inc., which has an aviation field on the Watrous farm at Chenango Bridge, nine miles north of Binghamton. Officers are Cheever J. Cameron, president and chief pilot; Walter C. Castle, secretary and treasurer. Other incorporators are George S. Cristman and Theodore M. Macomber. Runways have been developed at the field, of 2,000-foot



Maj. Chas. A. Woolley, director of schools for the Colonial Flying Service, Inc.

length, and office building has been erected, and plans are being made for a hangar.

**T**HE Cortland County Flying Club, of Cortland, 40 miles north of Binghamton, plans to construct a 15-plane hangar at a cost of about \$13,000. The building is to be 82 feet wide by 100 feet long, and will have an 18-foot clearance. It is to be constructed of steel, and cinder blocks. A machine shop, office and rest room will be provided in the building. his club has established a fund of \$3,000 to be distributed in membership prizes.

## NORTHERN NEW YORK

[ROLLIN JONATHAN FAIRBANKS]

**T**HE entire fleet of planes owned and operated by F. H. Taylor, Inc., lessee of the Watertown municipal airport, recently participated in an air circus held in connection with races under the auspices of the Watertown Elks.

**T**WO Stinson monoplanes were chartered from F. H. Taylor, Inc., by Northern New York Utilities for an aerial inspection of the company's power lines. Pilots Archie Lavery and Patrick Nolan flew the planes, the trip taking six hours.

**A** RADIO has been installed in the offices of the Watertown airport, and weather reports are received and posted daily. The northern portion of the field proper has been graded and rolled.

**T**HE chamber of commerce of Alexander Bay is interested in acquiring a municipal airport and has appointed Davis Comstock to take charge of the matter. Many visitors to the Thousand Islands desire to fly there, but the polo field on Wellesley Island is the only suitable terrain at present.

**T**HE Malone Aero Club, Inc., of Malone, N. Y., has purchased a Travel Air three-place plane and\* has leased the Sweet field on the Webster Street road. Oliver Townsend, it is planned, will be secured as an in-

structor; he has been associated with Flyers, Inc., of Albany. The officers of the club are: Clarence Dufort, president; W. Edward Aubrey, treasurer; Leo Dufort, secretary; and the directors are the officers and Douglas N. Callandar. A proposal to purchase the Sweet field and establish a municipal airport was voted down by the city, Drs. F. F. Finney and George Zimmerman have been appointed by the Department of Commerce as examining physicians for pilots' licenses.

**T**HE common council of Ogdensburg has refused to purchase the Julius Frank farm as an airport but has adopted a resolution favoring the proposition under private ownership. Flyers, Inc., of Albany, offered to lease the field from the city for a term of ten years at an annual rental of ten per cent of the cost of the property and initial improvements up to \$3,000. It is understood that no more negotiations will be made by the Albany firm this year because of the late date.

**I**NSPECTOR ASBURY MEADOWS of the Department of Commerce recently examined and gave private pilot's licenses to Glen Kinnie, Donald L. Alvord, Arthur Frasier, Lyle H. Eddy, and Pete Storino, all members of the Flying Club of Watertown. At a recent meeting of the club, Frederick H. Taylor, Willard Gamble, Lyle H. Eddy, and Steven Porter were appointed as a committee to revise the by-laws which have proven inadequate. Grace Gamble is the first and only woman in the club to take flying instruction.

**P**LANES of F. H. Taylor, Inc., have been chartered for surveying the power lines each month by Northern New York Utilities Company.

**T**HE Malone Aero Club has purchased a Travel Air biplane powered with an OX-5 motor and has begun flight instruction. The plane was delivered by Jerry Phillips and A. R. Mabry of Flyers, Inc., Albany. There are now about 15 members in the club.

**P**LATTSBURGH is to have a modern airport when the developing of the field is completed. A hangar with a capacity of four planes and of metal construction is to be erected, the conventional circle 100 feet in diameter will be laid out, a four-direction runway either L or H-shaped will be built, and the hangar will be air-marked. About \$15,000 will be spent on the field this season.

**M**ORE than 300 acres of land at Cicero, N. Y., has been acquired by Robert C. Hayes, of the Hayes Aviation Company. The acquisition includes a \$45,000 clubhouse which now contains the airport offices, and a clubroom for students in the flying school to be operated at the field. The airport has a frontage of 4,400 feet on the main highway from Syracuse to Watertown; there is also a restaurant at the field. Hayes Aviation, Inc., is the state distributor for American Eagle planes.

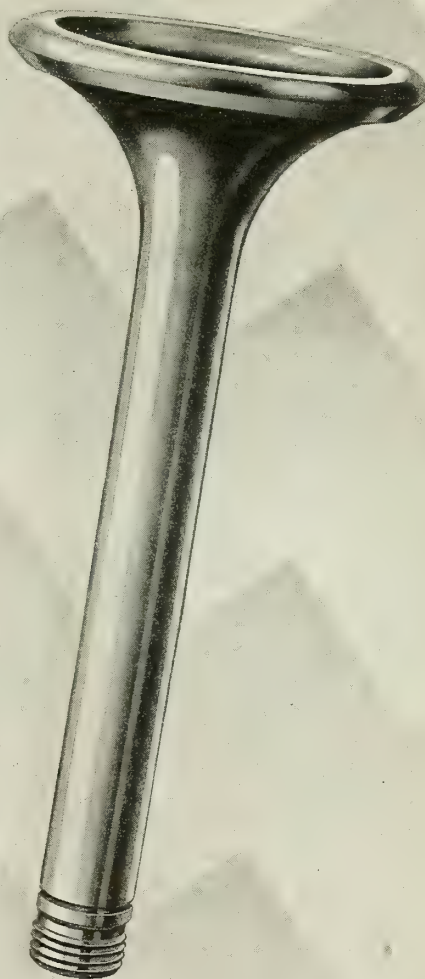
(Continued on next page)

# COOL UNDER FIRE

Thompson Valves have been original equipment in every important American endurance flight since 1924. In all cases they have kept "cool under fire."

It is this greater heat resistance, among other qualities, built into Thompson Valves by Thompson metallurgists, that has won the confidence of America's foremost fliers.

THOMPSON PRODUCTS, INC.  
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# Thompson Valves

Original Equipment in 95% of American-built Aero Motors



(New York News continued)

A GLIDER club, sponsored by employees of the General Airplanes Corporation of Buffalo, has been founded with an initial membership of sixteen persons. It is constructing a glider from JN-4 fuselage and tail surfaces, with standard J-1 wings. The machine has a gross weight of 750 pounds, a wing area of 325 square feet, and a landing speed of 27 miles an hour. It is a two-passenger ship, but will be flown as a single seater. A. L. Morse is president of the club and Edgar Rhodes is secretary and treasurer.

## ROCHESTER

[GEORGE S. SCOTT]

### Rochester Glider Club Formed

ROCHESTER GLIDER CLUB No. 10 of the National Glider Association was recently organized with F. E. Darling, president, and G. S. Scott, secretary-treasurer. The purposes of the club as outlined in its constitution are to build and fly gliders, promote gliding as a sport, and to study aerodynamic theories. The club has a limited membership, and is composed of a group of industrial and mechanical engineers and engineering instructors.

The first plane is now well under way in the school shops of the Mechanics Institute, the school having donated the use of the shops during summer vacation. This plane closely resembles the German primary training plane. It is a monoplane with a wing span of thirty-two feet, has open bridge type fuselage, and will weigh less than two hundred pounds. The next glider, the plans of which are now under consideration, will be an advanced type plane with a greater wingspan and an enclosed fuselage. The weight of this plane will be less than the primary plane, as sturdiness, an important factor in the primary plane, is reduced, and greater dependence is placed in the pilot's skill. The ultimate aim in the building for the club will be a soaring plane.

On a recent visit from Mr. Donald F. Walker, manager of the National Glider Association, an inspection trip for suitable terrain was made among the hills east and northeast of Rochester. A location was found about ten miles from the city, and there the Rochester Club expects to make its first flight in September.

A NEW Cunningham-Hall biplane to be entered in the International Safe Aircraft Competition at Mitchel Field, L. I., is being constructed in the Cunningham-Hall factory at Rochester. The plane will be equipped with high-lift wings, the upper wing being abbreviated, and the lower wing long to provide a low landing speed due to the cushioning of air on landing. The lower wing also contains a longitudinal flap with slot to provide increased lift, a device recently patented by Radolph F. Hall, chief engineer of the Cunningham-Hall Aircraft Corporation. Mr. Hall expects to use a light foreign built engine of approximately eighty horsepower, enclosed in an N. A. C. A. cowl.

## CENTRAL NEW YORK

[MILDRED MARVIN]

THE new Empire Air Flying Circus, which was recently organized by Hugh Brewster as a traveling unit of Empire Air Transport, Inc., has launched a series of exhibitions in their proposed national tour. New York State and New England cities will be visited by the Empire circus before it goes westward.

Major William C. Brooks is in charge of the circus. The circus personnel includes Ralph Hayes, Edward Nibur, Benjamin Mathews, R. S. Douglas, James Scott, Bill Weeks, Edward Churchill, and Joe McClatchie.

ORGANIZATION of a glider club is under way in Syracuse. The club has eleven members and recently purchased a glider built in a new Syracuse glider factory. Paul F. Wilbur and R. L. Gardner started the organization, and expect to increase their membership to thirty.

HUGH BREWSTER, general manager of Empire Air Transport, Inc., of Syracuse, recently announced a policy of placing the entire fleet of planes of the Empire concern at the disposal of physicians and nurses without cost in case of disasters. Under his proposal the Empire fleet of cabin and open airplanes will be ready to fly with physicians and nurses on short notice. Thus, in the event of serious industrial accidents, railroad wrecks or any accident in which many persons are injured and in need of medical attention, Empire planes will be available without cost.

APPOINTMENT of R. L. (Pete) Kincaid, manager of the Amboy Syracuse municipal airport, as a member of the board of control of the safety division of the Chamber of Commerce, was announced by Austin P. Saunders, manager. Mr. Saunders made known plans for the creation of an aviation section of the safety division.

### The Century Airplane Engine

THE Century in-line air-cooled engine, developed by Otto Hermann, Canastota inventor and president of the Century Rotary Motor Company, is to be produced in the Canastota, N. Y., plant of the company, according to an announcement of Mr. Hermann. The new Century in-line engine has four cylinders and is without carburetor, rocker-arms or push rods, according to the designer. Valve action is secured through an overhead cam, eliminating many of the usual parts. The gasoline is sprayed into the motor under air pressure automatically developed by the engine. A built-in supercharger is included in the engine's design. The engine is without gaskets, and develops 100 horsepower at 1,850 revolutions per minute. It is equipped with dual ignition, Scintilla magnetos being used. It has an electric starter and generator. The first motor turned out at the plant weighs 310 pounds. According to Mr. Hermann that weight will be reduced 30 pounds in the production engines.

## NEW JERSEY

THE General Motors Corporation recently acquired a 740-acre site near Hasbrouck Heights, N. J., for an airport. The land includes the present Teterboro Airport where extensive improvements are planned. The present airport is used by the Fokker Aircraft Corporation, which has a factory there, and by the Wright Aeronautical Corporation and the New Standard Aircraft Corporation.

AT a recent meeting of the board of directors of the Fokker Aircraft Corporation of America, Hasbrouck Hts., N. J., three men were elected to the directorship. The new directors, representatives of the General Motors Corporation, are Fred. J. Fisher, C. F. Kettering, and C. E. Wilson.

COLONIAL FLYING SERVICE, INC., subsidiary of the Aviation Corporation, has taken over the distribution of New Standard airplanes in the New England States, according to Charles L. Auger, Jr., president of the New Standard Aircraft Corporation, Paterson. Ten 5-place open-cockpit New Standards, powered with Wright Whirlwind engines, have been ordered for immediate delivery. Colonial Flying Service maintains a network of flying fields throughout New England and New York state, conducting flying schools, taxi and sightseeing services, and maintaining sales agencies and service depots for airplanes.

W. T. WHALEN has been appointed vice-president and general manager of the Fokker Aircraft Corporation of America, according to a recent announcement made by James A. Talbot, chairman of the board of directors. Mr. Whalen has been engaged in General Motors Company activities since 1920 and is leaving the position of vice president and general manager of General Motors Export Company, to join the executive personnel of Fokker. Mr. Whalen is a graduate in electrical engineering of the Iowa State College.

LIEUTENANT HOMER E. FACKLER was recently appointed demonstration pilot for the New Standard Aircraft Corporation, Paterson. He is touring the Southern Atlantic states accompanied by George Daws, Standard Aircraft sales manager.

ON a total order for twenty-one Fokker planes manufactured by the Fokker Aircraft Corporation of America at Hasbrouck Heights, N. J., nine have already been shipped by boat to Japan for the Japanese Air Transport Lines. The Japanese concern operates lines between Tokio, Osaka and Fockucka; Osaka and Kujo in the state of Korga, near Manchuria; Kujo to Darien in South Manchuria and from Osaka to Fockucka and to Shanghai, China. This latter line is the longest overseas passenger route as yet put into operation. The total order calls for twelve Super-Universal landplanes, three Super-Universal seaplanes, and six F-VII trimotors.

(Continued on next page)



WANTED: Aeronautical Engineer wanted for hull and cowling. Also experienced men in building and repairing aircraft. Aero Digest, Box 816.

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DESIGN

CONSTRUCTION

AIR TRAFFIC CONTROL

STRESS

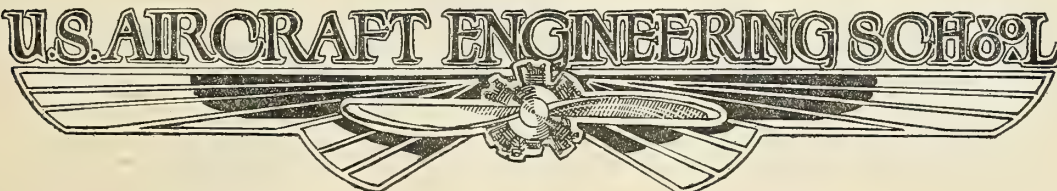
AIRPORT MANAGEMENT

AIRPORT ENGINEERING

The United States Government reports that the production of aircraft in the United States for the first six months of this year is double that of last year. The industry is growing beyond all expectations. Positions of importance are opening every day. The cry is for TRAINED MEN—men who can step in and handle the job, in an executive manner at an executive salary. The man who trains himself NOW is the man who will get in on the ground floor of this mammoth industry. The biggest jobs are for men who do the "brain work" of the industry. This is what we train you for.

The U. S. Aircraft Engineering School, Inc., is the first and ONLY school of its kind. The training it offers fits men and women to design, stress, inspect, and supervise the construction of planes, to lay-out and manage airports and to control air traffic. You will learn why an airplane flies; why the wing must be in a certain shape; why the landing gear must be placed correctly; how large the tail surfaces must be; the size of the spar; the size of tubing necessary—in fact, we teach you every detail that is so necessary for men who hold executive positions to know.

Your present employment does not matter. You can fit yourself for these big-paying jobs just like the many graduates we have had go out and make good. Hundreds of positions are open NOW—hundreds are opening up all the time. If you want to better yourself, make more money and do bigger things, take the first step now—fill in the coupon below and mail it today. It will bring you our attractive FREE booklet, "The Key to Opportunity in Aviation," which fully explains the opportunities open to you and the success of our graduates. Take this step towards a BIG CAREER. Mail in the coupon today.



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(New Jersey News continued)

**I**N order that the men who make American Cirrus Airplane engines may realize, through personal experience, the dependence which is placed upon airplane engines and upon the care and skill of the men who make them, American Cirrus Engines, Inc., a subsidiary of Allied Motor Industries, Inc., has opened an airport at Pine Brook, N. J., where instruction in flying is provided for workers of the Cirrus factory. The airport is near the American Cirrus plant in Belleville, N. J., where the Cirrus Mark III engine is being produced on a schedule of 10 completed engines each day.

The school is in charge of Capt. William N. Lancaster, late of the British Army, who trained fighting pilots during the World War, and who last year, made a 17,000-mile flight from London to Hobart, Tasmania, in a Cirrus-powered Avian. Capt. Lancaster is test pilot for the American Cirrus company. The company will provide the field, the instructor and the training ships for the training. The employees pay for gasoline and oil, a small amount for depreciation and supply the services necessary to keep the training ships in repair. The company has erected a stone and metal hangar at the field with adequate quarters for changing from street clothes into flying togs.

**T**HE Canvas Leather Specialty Company of Trenton, N. J., manufacturer of flying clothes, has been awarded a contract by the Army Air Corps for 487 Type-B winter flying suits. This is the regulation suit for all Army pilots and is made from a genuine calfskin, lined with heavy all-wool felt. Nutria collar and zipper fasteners throughout are provided. Thus far this firm has been the only manufacturer to make these suits for the Army, having completed an initial contract for 800 a few months ago.

## CONNECTICUT

[RUTH W. HUMMELL]

**T**HE L. & H. Aircraft Company has started business under the ownership of the Colonial Flying Service. The company will operate as the local division of a group of branch schools, owned throughout the territory covered by the Colonial Airways system. Charles B. Beach, former president of L. & H., will act as Colonial's local manager in addition to acting as sales manager for the entire New England district.

**T**HE New England Aircraft Company is one of the oldest operating companies in New England, having been organized January 1, 1926. The officers of the company—Percival H. Spencer, president; Ralph C. Barrows, vice president; and Charles J. McLaughlin, secretary and treasurer,—have carried on the business of the company since its inception. They operate two fields, one being Whittall Field at Worcester, Massachusetts, recently completed at a cost of \$75,000. This field has excellent lighting equipment, including boundary, approach, obstruction lights, rotating beacon, B.B.T. floodlights, and a ceiling projector. This

field is under the management of Erwin K. McWilliams, who is also in charge of the flying school.

The other field is Brainard Field, located at Hartford, Connecticut.

**T**HE steel construction contract for the manufacturing unit of the Pratt and Whitney Aircraft Company's new \$2,000,000 plant in East Hartford, Conn., has been awarded to Levering and Garriques of New York and Hartford. Steel construction work will start September 12th, and, according to the terms of the contract, will be completed by October 7th. Plans for the balance of the construction work for the administration and other buildings in connection with the manufacturing unit are about completed and will be ready to be put out for competitive bidding soon. Approximately 2,200 tons of steel will be used in the construction of the plant proper. The new plant, which will have an increased capacity of 50 per cent for producing Wasp and Hornet engines, will be finished and in operation shortly after the first of the year.

**A** SERIES of ball bearings adapted for airplane control mechanisms has been made available to plane manufacturers by the Fafnir Bearing Company, of New Britain, Conn. These bearings, known as the S series, are of the single row radial type with inch dimensions and narrow widths. They are available in bores from  $\frac{1}{4}$  inch to 1 inch.

## OHIO

[T. E. LUNSFORD]

**T**HE Aerial Rapid Transit, Inc., Youngstown, plans to begin operating an air passenger line between Cleveland, Youngstown, Pittsburgh, Washington, and Baltimore.

**A** LARGE number of planes took part in the American Legion air circus at Alliance, Ohio, August 3 and 4, at which time the airport was dedicated. One of the features of the event was the outside loop of Lieut. William J. Leonard, chief test pilot for the Alliance Aircraft Corporation. Other features presented included air races, mimic air battles, parachute jumps, dead stick landing, refueling in flight exhibitions and stunting contests. The committee in charge were William J. Leonard, Roy Shoellhorn, and E. F. Owen.

**P**LANS have been completed by the joint aviation committee of the Chamber of Commerce and the Kenton American Legion Post for the dedication of the Kenton, Ohio, airport at the Cedar Lawn dairy farm. The airport and landing field was completed by John Fulton and son, owners of the farm, with the assistance of the Chamber of Commerce and Legion.

**T**HE Cleveland Auto Club has created an air route information service, according to Fred H. Caley, club secretary. A number of trips have already been made and a great deal of detailed information as-

sembled. It will soon be put into printed form and distributed to the general public at the Consolidated Air Travel Ticket Office maintained by the Auto Club and the Cleveland Airport Operators Association.

**T**HE first step toward strict enforcement of the Ohio aeronautical code was taken recently by John M. Vorys, state aviation director, when he warned the public to first inspect the license of a plane and the pilot's license before going on a flight. Vorys advised persons preparing to use aircraft to determine for themselves whether the pilot's license has been approved. Vorys asserted that planes are as safe as other type of transportation if they conform with state and federal regulations.

**T**HE citizens of Lima, Ohio, are to vote on a bond issue of \$175,000 to defray the cost of a municipal airport at the November election. If the issue is passed it is proposed to purchase sufficient land to give the airport an area of 300 acres.

**E**STABLISHMENT of a \$2,000,000 airport to serve the East Side and the Cleveland Heights has been announced by R. P. Cunningham, vice president of Cleveland Heights Air Terminals, Inc. Work of developing more than 250 acres of land on Ridgebury Boulevard between Ford and Lander Roads, Highland Heights, will be started the latter part of August.

The port will be developed as an all weather, semi-public field, with accommodations for every flying activity. It is anticipated that transcontinental air lines will use the field because of its location with reference to surface and transportation lines. The company plans to establish passenger service between Cleveland and various points in Canada as well as with Charleston and other West Virginia cities, and planes will be available for private charter at all hours. A flying school and an agency for at least two makes of planes will be established, according to the announcement. Mr. Cunningham, who organized Continental Air Lines, Inc., operating the Cleveland-Louisville air mail routes, will be general manager, and Col. Harold D. Hartney, head of the Aviation Business Bureau, Inc., of New York, and commander of the first Pursuit Group during the World War, will be technical advisor.

**T**HE Continental Air Lines mail and passenger service, operating between Cleveland, Columbus, Cincinnati and Louisville, flew 302,519 miles during its first year of operation, which ended August 1. A total of 84,476 pounds of mail was carried by the service.

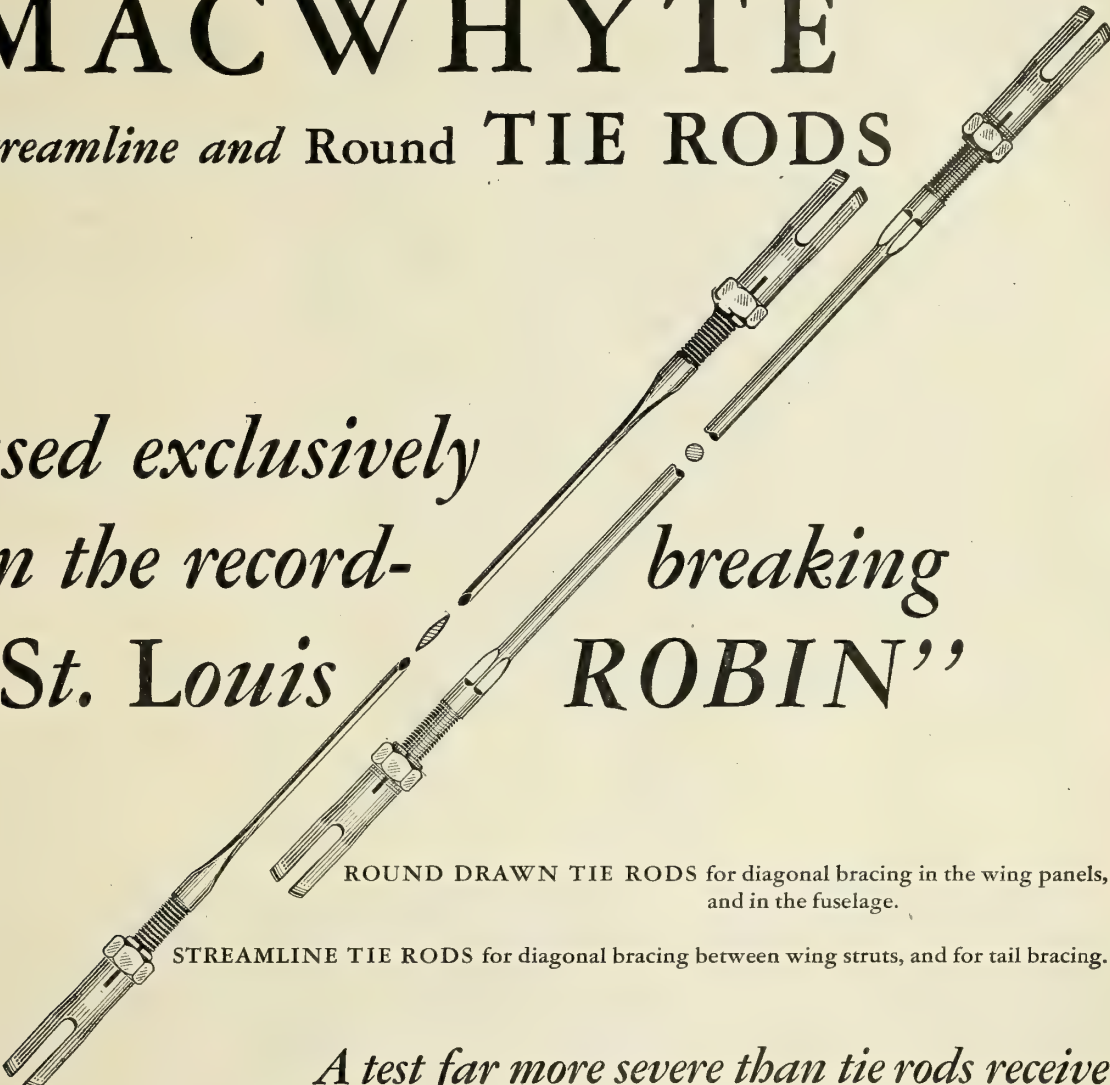
**T**HE plant of the Canton Drop Forging and Manufacturing Co., Canton, Ohio, is being remodeled into a modern manufacturing plant for straight-line production of aircraft and automobile parts. The structure, when completed, will be more than 450 feet in length and 65 feet in width. G. A. Brauchler is president of the company, W.

(Continued on next page)

# MACWHYTE

*Streamline and Round* TIE RODS

*used exclusively  
on the record-  
"St. Louis breaking  
ROBIN"*

The illustration shows two types of tie rods: 'Streamline Tie Rods' which have a tapered, aerodynamic shape with a threaded section at one end, and 'Round Drawn Tie Rods' which are standard cylindrical rods with threaded ends and nuts. They are shown in various orientations, some with nuts and washers attached.

ROUND DRAWN TIE RODS for diagonal bracing in the wing panels, and in the fuselage.

STREAMLINE TIE RODS for diagonal bracing between wing struts, and for tail bracing.

*A test far more severe than tie rods receive  
in several years of ordinary flying service.*

*Proof of absolute dependability.*

MACWHYTE COMPANY

*Kenosha, Wisconsin*

Visit our Booth, Number 175, at the Cleveland Aeronautical  
Exposition, August 24 to September 2.



(Ohio News continued)

E. Koltz is vice president, and K. S. Goodin is secretary and treasurer.

**T**HE Mid-City airport, a new privately owned port, is being developed just north of Darrowville on the Hudson-Cleveland road, by the Mid-City Aircraft Corp., organized by Carl Wollam, and D. Barr Peat, to take over the Ohio and Pennsylvania distribution of Bird airplanes. Work will be completed within the next two or three months.

An air school, two complete landing fields, one for passenger and one for student flying, a 120-foot square hangar which will hold approximately 30 planes, complete equipment for servicing airplanes, and complete lighting for night flying will be included at the port. Approximately 1,000 acres are included in the tract which the Mid-City Aircraft Corp. holds under lease. Five runways are being prepared.

[C. L. KIEFFER]

**G**OV. MYERS Y. COOPER, John M. Vorys, Ohio's first aeronautical director, and Clifford Henderson, manager of the 1929 National Air races, were among those present at the dedication and official opening of Port Mills, at Lorain, O., August 27. Twenty-three visiting planes took part in the event. Port Mills is a level tract of 136 acres located near the route of the transcontinental airway. A metal hangar to accommodate 12 planes has been constructed and an old brick schoolhouse has been converted into classrooms for an aviation school. The field was established by Richard W. Mills and Leland Mills, under the name of Lorain Airways Service, Inc. It is a private commercial airport.

**T**HE Baker McMillen Company, a wood-working firm of Akron, Ohio, recently began the construction of training and soaring gliders, under the supervision of Franz Gross, designer of the German Darmstadt soaring glider. It will construct primary and soaring planes.

The primary glider is to be of conventional design and is built sturdy for pilot training. The soaring glider will be a development from the Darmstadt plane, and of the same type which soared four hours off Cape Cod last year. It will have an aspect ratio of 20.

**F**RANZ GROSS, designer of the German Darmstadt soaring glider, recently arrived in the United States and is establishing himself at Akron, Ohio, where he will be employed to carry out experiments looking towards the manufacture of gliders. Mr. Gross will build a new soarer which will be along the same lines, but more highly refined, than his Darmstadt which was recently flown by Pilot Nehring of Germany for 42 miles down the Valley of the Rhine.

It will have an aspect ratio of 20, which marks it as one of the most extreme designs undertaken for motorless flight. He will also cooperate with the National Glider Association in the selection of terrain not only for flying his own glider, but for the use of glider enthusiasts all over the U. S.

**A**IR passenger and express service was started recently between Cincinnati and Detroit on a schedule of two planes a day by the Mason-Dixon Air Lines, Inc., operating from Lunken Airport at Cincinnati. Stops on the route include Middletown, Dayton, Lima and Toledo. Nicholas Longworth, Speaker of the House of Representatives, gave an address at the inauguration of the service.

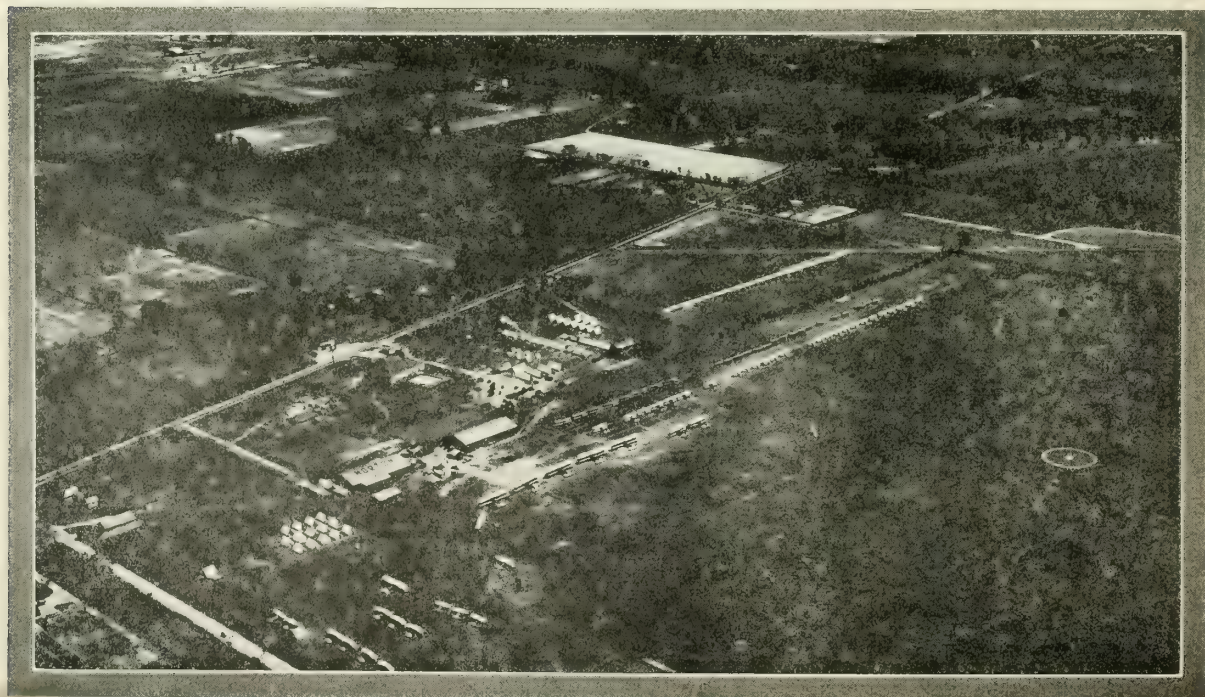
**C**ONSTRUCTION work on the hangar of the Thompson Aeronautical Corporation at the Cleveland Municipal Airport is progressing rapidly and will be completed in time for the National Air Races. When finished, the Thompson hangar will be the largest at the airport, being 250 feet deep by 75 feet wide, with a total floor capacity of 11,250 square feet.

Eighty feet of the enlarged building will be combined with the present 100-foot depth for airplane storage. The other 70 feet will be a machine shop. The complete building with its equipment will represent a value of \$150,000. The need for enlarging the old hangar was necessitated by increasing operations. The Austin Company is doing the work.

A complete model weather bureau will be installed in the hangar of the Thompson corporation by the Consolidated Instrument Company for use during the National Air Races. Weather reports will be broadcast daily at regular intervals over loud speakers. All instruments necessary to obtain the correct data on the weather will be set up in the TAC hangar. Spectators will be given an opportunity to observe how information regarding the weather is obtained for the use of air mail pilots and commercial fliers.

**J**AY R. O'CONNELL has been appointed regional sales director of the Curtiss Flying Service for Ohio and Kentucky. Mr. O'Connell is a former world war flyer, having served with the Forty-Fifth Squadron, British Expeditionary Force. He will direct the establishment and control of agencies and sales dealerships for the planes and products of the Curtiss Aeroplane and Motor Co. and its associated companies. It is also announced that J. B. Medaris has

(Continued on next page)



Norton Field, Columbus, during the Air Corps maneuvers. The municipal airport is in the upper left corner

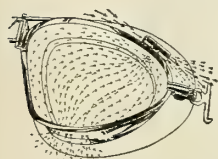
Photo courtesy of Columbus Flying Service



WILL  
NOT  
FOG



WHY IT WILL NOT FOG



Pat. and Pats. Pend.

Specially designed suction tube at top catches slip stream at any angle and forces a draft which pulls air in through staggered perforations at bottom. Air passing over back of lens keeps it clear and prevents fogging. Perfect ventilation *without air leaks* and without direct air needles.

A new and better Aviation Goggle  
Adopted by U. S. Army Air Corps

THESE new goggles have been flown at 25,000 feet, and they did not steam or fog. Positive ventilation behind the lens keeps them clear and transparent at high altitudes—a truly remarkable achievement in goggle design confirmed through their adoption by the United States War Department Air Corps.

Many other features make this goggle unusually comfortable, efficient and convenient. The field of vision is unusually wide. The pads of soft rubber are so shaped and constructed that they fit the face perfectly without permitting air leaks, or exerting uncomfortable pressure at any point.

Note the sturdy construction. The American Transport is built for years of service. The nose bridge is

braced. Every part of the goggle can be adjusted, removed or replaced with the fingers. No tools needed. The soft rubber cushions fit any face. They are easily removed, and replaced, with the fingers.

By a new and patented principle of aviation goggle lens design, all prismatic and astigmatic effects, *the causes of goggle headache*, are removed. The cylindrical lenses are decentered so that the optical centers are in direct line with the straight-ahead line of vision. Lenses are either in white glass, or Calobar glass which is glare-proof, but does not alter color values. *Prices:* with clear white lenses, \$20; with Calobar glass, \$24.

*Government orders are now being completed. Send coupon for folder describing these new goggles in detail.*

AMERICAN TRANSPORT  
AVIATION GOGGLE

An AMERICAN OPTICAL COMPANY product

American Optical Company  
Southbridge, Mass.  
Dept. 111

Please send, without obligation, folder describing American Transport Aviation Goggle.

Name.....

Street.....

City & State.....



(Ohio News continued)

been named sales and traffic manager of Columbus and central and southern Ohio. Medaris was formerly a first lieutenant in the ordinance department of the U. S. Army, stationed at Wright Field, Dayton.

**I**N a contract entered into with the city of Akron, Air Services, Inc., a flying school and air transportation company of that city has leased 14,400 square feet of ground at the Municipal Airport for 25 years. Rental for the ground is 1 cent a square foot for the first year, 5 cents the second, 6 the third, 8 the fourth and 10 the fifth. The city has the privilege of buying the building investments at any time.

**T**HE Coshocton airport was dedicated July 25, by John Vorys, state director of aeronautics, in the presence of more than 5,000 people. The Coshocton airport, which was established in April, was only recently completed to provide landing facilities for every type of plane.

**A** COMMITTEE to further aviation in Columbus has been named by the Exchange Club. James M. Linton, attorney, is chairman. Other members appointed by president R. Reid Vance are: R. P. Bell, J. C. Campbell, P. A. Dolle, Postmaster James R. Geren, Harrison Nutter, Dr. H. M. Brundage and Eddie Gettrost. The committee will sponsor the visit to Columbus of the ordinance department of the U. S. Army, August 25 and 26.

**L**IEUTENANT J. A. REECE, formerly connected with the British Royal Flying Corps, has been appointed head of the Robbins Aviation College, Inc., Akron, O. Lieutenant R. W. Barnes, who has been in charge of the aviation college since its inception early this year, has resigned.

**N**EW airport equipment installed at Port Columbus, includes an illuminated wind cone and ceiling light tower manufactured by the International Derrick and Equipment Co. of Columbus.

By means of a ceiling light controlled from the airport dispatcher's office, a light beam is thrown at an angle of 68 degrees upon the clouds, and the height determined by sighting through an instrument placed on the office roof, providing a quick and accurate method of determining the ceiling. The towers resemble somewhat the standard Ideco airway beacon towers. They are 35 feet tall and have a bracket for the ceiling light placed seven feet below the top. A six-foot pipe extension carries the wind cone, four lights with reflectors for illuminating the cone, and an obstruction light. Provision is made for the wind cone to rotate freely with no danger of fouling.

The towers are built of structural steel, hot-dip galvanized after fabrication, providing complete protection against rust and corrosion. They are built over jigs and dies, insuring the fit of every member. Towers of other heights are produced by the International firm.

**R**OBERT E. LEES, sales manager of the Waco Aircraft Company of Troy, Ohio, was recently elected to the board of directors of the organization. Mr. Lees will continue as sales manager of the firm.

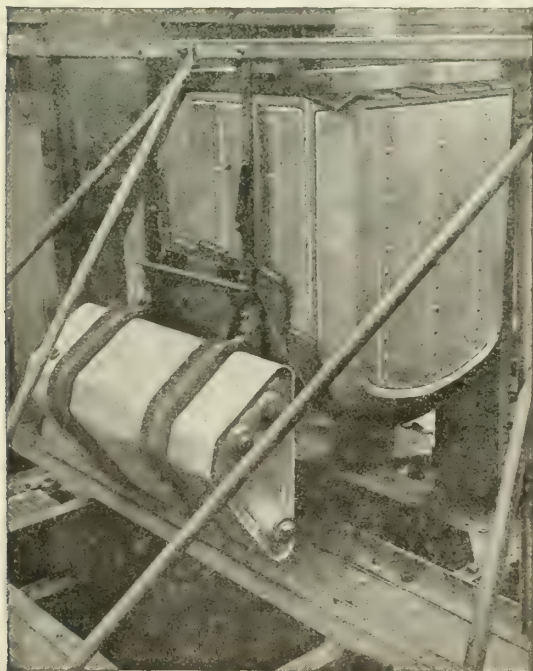
**R**OBERT S. VAN CLEVE was recently appointed aeronautical development engineer of the Willard Storage Battery Company of Cleveland, Ohio. Mr. Van Cleve will take charge of aircraft activities, including research and development of the Willard Storage battery as it applies to the aircraft industry.

**T**HE roof of the Erie Railroad freight house at Garrettsville, Ohio, has been marked for air identification by C. C. Andrews and Raymond Andrews. The letters are eight feet by five feet in size.

**R**EX HARKER set a new world's record for a delayed parachute jump recently, when he left a plane at 11,800 feet above Lunken Airport, Cincinnati, and fell 9,600 feet before pulling the cord of his parachute. The jump was observed by F. G. Mason, Army parachute supervisor at Wright Field, Dayton.

**F**LYING at a speed of 60 miles an hour, a Waco airplane recently towed a glider from Ypsilanti, Mich., to Akron, Ohio, a distance of 160 miles. Hugh C. Robbins piloted the motorless plane.

(Continued on next page)



The perfection of these Paramount-built BOEING fuel and oil tanks is demonstrated in this Navy-standard vibrating cradle. 3,600 shocks per minute are applied for twenty-five hours without developing the slightest leak or flaw.

## MAKING GOOD TANKS BETTER

**W**HEN THE U. S. NAVY BUYS fighting planes, it insists on perfect tanks ... tested to guarantee strength, durability, safety.

For years, Paramount tanks have been standard for many Navy planes. Navy tests are applied by Paramount Navy-standard equipment in the large, modern Paramount plant.

The superiority of all Paramount tanks is due in large part to the wealth of experience gained in making better tanks perfect for Navy use.

Paramount Tanks designed for commercial use may also be vibration-tested to Navy requirements. Write for details

# PARAMOUNT

WELDED ALUMINUM PRODUCTS CORP.

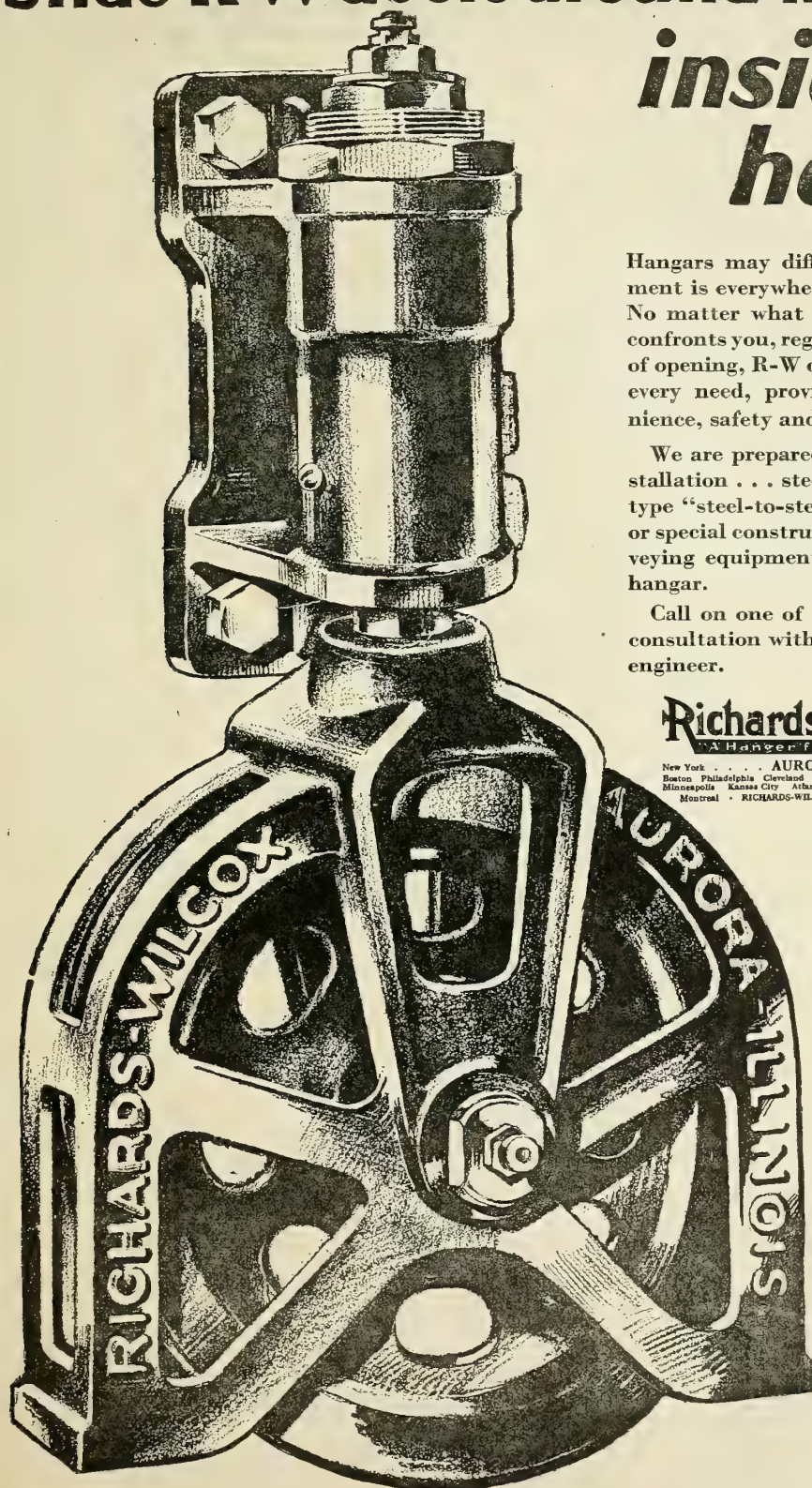
195 MORGAN AVE.

BROOKLYN N. Y.

"Paramount Tanks Are Better"



# Slide R-W doors around the corner *inside the hangar*



Hangars may differ, but R-W door equipment is everywhere recognized as standard. No matter what kind of doorway problem confronts you, regardless of height and width of opening, R-W doors and equipment meet every need, providing the utmost convenience, safety and economy.

We are prepared to make any type of installation . . . steel doors, Super-Way mill-type "steel-to-steel" doors, corrugated, flat or special construction. Also Over-Way conveying equipment essential to the modern hangar.

Call on one of our branch offices for free consultation with a qualified R-W door-way engineer.

## Richards-Wilcox Mfg. Co.

*"A Hangar for any Door that Slides"*

New York . . . AURORA, ILLINOIS, U.S.A. . . . Chicago  
Boston Philadelphia Cleveland Cincinnati Indianapolis St. Louis New Orleans Des Moines  
Minneapolis Kansas City Atlanta Los Angeles San Francisco Omaha Seattle Detroit  
Montreal • RICHARDS-WILCOX CANADIAN CO., LTD., LONDON, ONT. • Winnipeg



*"Quality leaves  
its imprint!"*



(Ohio News continued)

**T**WO Waco 300 airplanes are being delivered to "Speed" Holman of the Northwest Airways for use as night air mail carriers. These planes are powered with Wright Whirlwind Nine engines, and are of the Waco taper wing type. The front cockpit is adapted to mail carrying and is covered with a laced top. Landing lights are attached to the wings. The fuselage and rudder are finished in black, with the wings, elevators and stabilizer in gold.

## COLUMBUS

[W. DONALD WALTER]

**C**URTISS FLYING SERVICE is now conducting all its flying operations from Port Columbus. A number of students have enrolled in both the ground school and flying courses. Ground school classes are held at the company's downtown office on East Broad Street.

Lieutenant Ralph B. (Sam) Scott has been added to the flight instruction staff, which includes Lieutenants Grant Melvin and Sam Sharp, and Harold Distelhorst. Melvin, Sharp and Scott are army-trained, and all three are members of the 308th Observation Squadron, which is attached to Norton Field. Distelhorst was trained by the Columbus Flying Service at Norton Field.

**A**WOVEN wire fence, extending from the administration building along the taxiway and around the back of the T. A. T. hangar, has been erected at Port Columbus. Three special officers have been appointed to assist in handling the crowds. Concrete is being poured on the extension of the runways and progress has been made in leveling and grading the section of the field within the V formed by the two intersecting runways. The hangar for Curtiss Flying Service, Inc., is completely under roof, and a large part of the brick work has been completed. The municipal hangar is also under way.

**A**RGH SUMPTER has left the local reserve fliers staff to join Curtiss Flying Service, effective August 10th. Air Corps officers attached to Norton Field will not forget the splendid shape in which he has kept our ships, and the best wishes of all of us go with him to his new position.

**T**HE first night landing of a T. A. T. ship carrying passengers was made during the early part of August at Port Columbus. A wreck on the Sante Fe delayed the rail connection at Waynoka, and it was necessary for the ship to proceed to a town across the Texas line and there pick up the air passengers. A landing near the stalled train was successfully made with the assistance of Lieutenant Victor Bertrandis, Air Corps, one of the air-rail passengers, who improvised panels to guide the ship to a suitable field. The Ford arrived at Columbus slightly after dark, and with the aid of the field lights made a perfect landing. The pilots reported that the functioning

of the lighting equipment at the port was most satisfactory.

**T**HE Capital Die, Tool and Machine Co., Columbus, is adding more space to its plant for the purpose of manufacturing airplane tools. The company has been manufacturing tools for automobiles.

## CLEVELAND

[M. MIRVIS]

**U**NITED STATES AIR LINES recently announced an aerial charter service from Cleveland with government licensed equipment, consisting of both open and closed planes. Stewart V. Kramer, chief pilot, is in charge of these operations. United States Air Lines is distributors of Ryan monoplanes.

**T**HE Cleveland Institute of Aviation has moved into its new hangar at Cleveland Airport. The hangar represents an investment of \$100,000; and about \$25,000 worth of equipment, not including the value of the planes, will be kept here. The hangar is 120 by 140 feet and contains classrooms, school headquarters, storage space, and workshops. The Institute is the Ohio distributor of Consolidated Fleet planes. Captain Fred Smith, of the 112th Observation Squadron, is school director, J. C. Wise is chief pilot, and assistant to him are Lieuts. Samuel J. Price and C. D. Barnhill, of the 112th Observation Squadron.

**C**LUB women of Cleveland have formed the Cleveland unit of the National Aeronautical Association to promote aviation. The group was formed primarily to cooperate with the executive committee of the National Air Race and Show Corporation.

**C**LEVELAND AND AKRON GLIDER club members held recent tests flights at Cleveland, using the glider made by Otto Horn, member of the Cleveland club. The motorless plane reached an altitude of 75 feet.

**U**NIVERSAL FLYING SCHOOL at Cleveland has added three new instructors to its faculty. J. C. Wise, formerly chief pilot for Cleveland Institute of Aviation, Albert H. Craven, formerly with Universal School at Memphis, and George H. Buttles, formerly with Universal School at St. Louis, are the new faculty members.

**C**OOPERATIVE arrangements have been completed between the Thompson Aeronautical Corporation and the Eastern Michigan System of car and bus lines whereby the air, electric, and bus services of the two firms are coordinated.

**E**IGHTEEN bombing and torpedo planes have been ordered by the United States Navy from the Great Lakes Aircraft Corporation of Cleveland. Deliveries are to start October 7, this year, and the entire order is to be completed by March 1, 1930. These ships, to be known as the TG-1 series, are a development of the Martin

T4M-1, with minor modifications and improvements.

The TG-1 is quickly interchangeable from landplane to seaplane, twin floats being furnished with each ship in addition to the regular wheel type landing gear. The wings are constructed to fold back to permit storage on the deck of a carrier. Flotation gear, consisting of three gas bags, one on each side and one in the tail, will be supplied as a safety measure.

The design is an equal span, unstaggered, single-bay biplane, with a wingspread of 53 feet, a length of 35 feet 2 inches, and a height of 12 feet 7 inches. Total weight, including armament and crew, is 7,702 pounds. The ships will be constructed of duralumin with fabric covering. A Pratt and Whitney Hornet engine of 525 horsepower will be the power plant. Performance is as follows: Maximum speed 116.5 miles per hour; cruising speed 100 miles; landing speed 59 miles; climb in first ten minutes 4,790 feet; service ceiling 9,260 feet. The range at cruising speed is 665 miles, and the range at full speed, 502 miles.

**B**EACON Airways of Kansas City, Mo., has been appointed distributor of the Great Lakes Aircraft Corporation of Cleveland for western Missouri, Kansas and Oklahoma. An initial order for 40 Trainers, combination training and sports biplanes, has been placed by Beacon Airways.

**T**HE Great Lakes Aircraft Corporation of Cleveland has inaugurated a series of training courses for office and shop supervisors, including foremen and sub-foremen.

The present course is being conducted by Prof. C. W. Hall of the Collinwood High School, Cleveland. Classes for foremen and sub-foremen are being held in the company's offices three times a week, from 10:30 to 11:30 in the morning. The object of this preliminary course is to study the problems of teaching as applied to vocational subjects so that more effective training of workmen may be accomplished.

**T**HE Thompson Products Inc., Cleveland, reports net earnings of \$6464,021 for the first five months of this year after all charges and federal taxes, an increase of 55 per cent over the corresponding period of 1928.

**T**HE Glidden Company of Cleveland has announced the Glidair line of finishes for airplanes. The Glidair lacquers and dopes include materials for finishing fabric, metal, plywood, and the interior of metal tubing. The Glidden firm maintains a consulting service on the use of aircraft finishes.

**L**EWIS W. KING has been appointed divisional traffic manager for the Thompson Aeronautical Corporation in the Cleveland district, according to Charles A. Rheinstrom, general traffic manager of the firm. Mr. King was formerly in the Aircraft Bureau of the Detroit Board of Commerce.

(Continued on next page)

# **Dayton Bear**

## **FOUR-IN-LINE AIR COOLED**

Super performance, low upkeep.  
Manufacturer's rating, 110 horsepower at 1550 revolutions per minute. 120 horsepower at 1850 revolutions per minute.

**Immediate Delivery**

**THE DAYTON AIRPLANE  
ENGINE CO.**

**DAYTON**

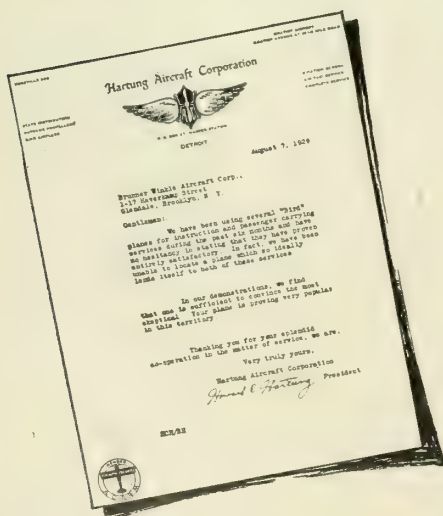
**OHIO**



# "BIRD"



## Why they suit the DEALER!



Safety in Training—Speed in Transportation

**DEPENDABILITY at all Times**

**T**HE MERE SELLING of a plane is NOT ENOUGH.

Many times the sale depends upon instruction; often a sale is made to a newly qualified pilot. The dealer's problem is to sell the plane which will afford the quickest instruction and at the same time assure the new pilot of the highest degree of personal safety.

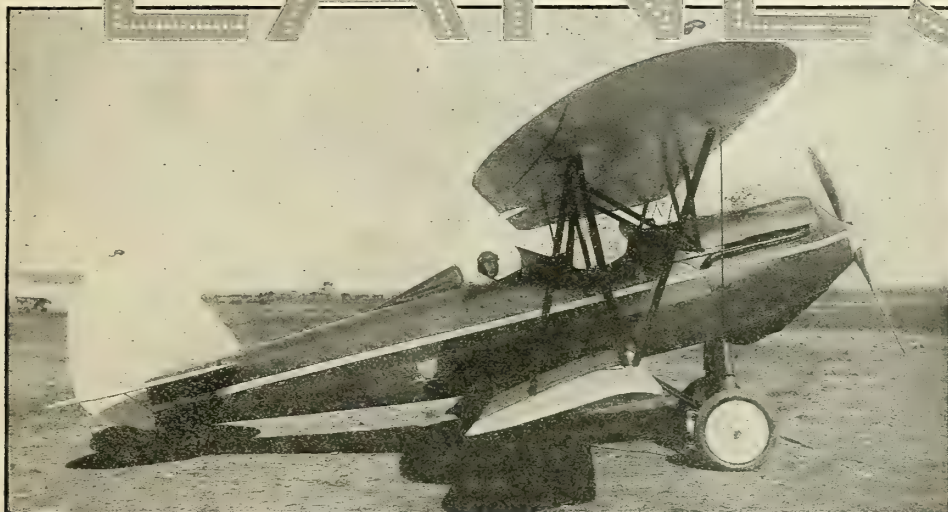
And again, to sell for transportation means the selling of speedy miles, ease of handling, and low cost of operation.

BIRD dealers are satisfied that these planes embrace the features of ALL THAT CAN BE DESIRED IN THE FINEST OF AIRCRAFT.

**"MORE PERFORMANCE PER HORSEPOWER"**



# PLANES



## Why they suit the FLYER!

1. Chrome molybdenum tubing throughout.
2. Inherent stability perfected to a degree which allows fool-proof student training.
3. Dual control with front unit quickly detachable for passenger carrying.
4. Perfection in aileron design.
5. Wing design perfected aerodynamically to a degree which permits performance comparable to slotted wings.
6. Landing gear of split axle type with combination oleo and rubbershock absorbers.
7. Metal turtle deck from front to rear allowing internal inspection.

**W**HEN a BIRD pilot gives her the throttle he knows that he can **OUTSPEED** any other ship of the same horsepower.

When he hovers over a small field he knows that he can **LAND SAFELY**—and **GET AWAY** with **EASE**.

When he takes a passenger—whether for hire or as a guest—he knows that his passenger is afforded the **HIGHEST DEGREE OF SAFETY**.

When he lands in a strange field he need not apologize for his plane, because he knows that he has just brought in the **GREATEST PERFORMER PER HORSEPOWER**.

Confidence and pride are manifested in the satisfaction with which the pilot regards his **BIRD**.

**BRUNNER-WINKLE AIRCRAFT CORPORATION**

17 Haverkamp St., Brooklyn, N. Y.





## WASHINGTON, D. C.

[WING OVER]

A PASSENGER airline between Washington and Pittsburgh was inaugurated on August 14, by Clifford Ball, Inc., who operates the Pittsburgh-Cleveland air mail route. Fairchild 71s are used on the Washington run, and Hoover Field is the terminus at Washington, by arrangements with the Potomac Flying Service, Inc. The airline distance to Pittsburgh is 188 miles. The planes will average less than two hours for the trip, as compared to eight hours by train. The present schedule is one plane a day each way, both leaving opposite ends of the run at nine in the morning.

ON Sunday, August 11, passengers flown over the capital city from Washington Airport totalled 225. This represents a peak day's business. One Ryan and two Wacos were used. Hoover Field is using J5 Standards with a Fleet Husky Jr., to take single passengers when others are not there to fill up the five-place Standard planes. Potomac Flying Service, Inc., has discontinued the operation of the Loening amphibion from Hains Point, but is still operating speed boats from that base opposite the Naval Air Station.

WITH Colonel and Mrs. Charles A. Lindbergh, guests of the President over the week-end of August 10, rumor is current that the Colonel may be asked by the administration to succeed the Hon. Bill MacCracken as Assistant Secretary of Commerce to Aeronautics. Mr. MacCracken arrived in New York on the Leviathan on

August 12, and has repeatedly signified his desire to resign. What could be more appropriate than an announcement during the National Air Races to the effect that Colonel Lindbergh will hold the most important post in the air cabinet?

A. M. MILLER, Washington real estate operator, has succeeded Major Harry Horton as president of Congressional Airport, Inc. Major Horton, who recently received his transport license at the age of 53, is retiring from an active part in the business because of ill health. He retains, however, his place on the directorship of the company. Frederick Schauss, former Army pilot, acts as chief flying instructor and airport manager.

Roger W. Scott has been made acting operation manager to succeed Captain Ira Eaker. Scott, being but 22 years of age, is probably the youngest executive in the country in complete charge of such extensive flying operations.

FEDERAL AVIATION, INC., is enabling Washington Flying Service, Inc., of which Robert E. Funkhouser is president, to extend Washington Airport from its 1,400 foot runway to a three-way field, with two runways of 2,500 feet and one of 2,700. A subsidiary of Washington Flying Service, the Washington-New York Air Line, Inc., has three Lockheed Vegas. At Washington airport there are two Ryans, five Wacos, and one KR Challenger. It is planned to establish a 1,000-acre airport for training in the vicinity of Alexandria, Va. Personnel at Washington airport includes

Paul J. Rabbitt, manager, M. A. Crowder, and Captain George Ed. Davis. W. Burns Trundle, formerly pilot at Washington Airport, is now in China for Aviation Exploration, Inc.

HOWARD SUTHERLAND has been elected president of the Washington Air Terminals Corporation, which recently purchased the Washington-New York airline and the Washington Airport. Associated with Mr. Sutherland in the directorate of the new corporation are C. Bascom Slemm, M. C. Cooper, James O. Watson, Major Gen. William M. Wright, U. S. A., retired, and David K. E. Bruce. These officers plan an expansion of the Washington Flying Service airport, located on the banks of the Potomac directly across the river from the National Capital.

THE District of Columbia's first self-sustaining flying clubs are being formed by the Washington Flying Service. The clubhouse and training field for the clubs will be located at the Thousand-acre Airport of the Washington Air Terminals Corporation two miles south of Alexandria, Va. This firm is new owner of the Washington Airport and the Washington-New York Air Line. The first men's club will begin actual training August 1.

The initial program of the Flying Service provides for the establishment of eight individual clubs. Each club will have a maximum membership of 25 who are able to pass the required physical and mental examination. The club instructors will be drawn from qualified pilots of the Wash-

(Continued on next page)

## What Determines Your Choice of FLOODLIGHTS

*Printed Superlatives . . . Extravagant Claims or*

### PROVED FACTS

**proof OF RELIABILITY—B.B.T.** (Pioneers in Airport Lighting) points to uninterrupted performance of its Floodlights since their installation on the first Transcontinental Air Mail line in 1924.

**proof OF MAXIMUM EFFICIENCY—**Greatest Illuminated Area Coverage insured thru exclusive use of 180° Fresnel Lens in combination with High Intensity Arc or High Wattage Incandescent Lamps as light sources.

**proof OF MINIMUM GLARE—**Complete vertical and horizontal Beam Control thru exclusive use of Fresnel Lens and even distribution from single light source over a TRUE 180° spread.

**proof OF GREATER ECONOMY—**Because of greater illuminated area coverage fewer units are required to light a comparable area with consequent savings in initial unit purchases, installation, upkeep and depreciation.



It was NO ACCIDENT that Transcontinental Air Transport, Inc., chose B.B.T. for its ports of call, nor was it guess-work on the part of the Cities of Newark, Denver, Buffalo St. Paul, Cincinnati, Wichita, Kansas City, Lincoln, Bay City, (recent additions to the list of practically all of the World's Major Airdromes Floodlighted by B.B.T.) that they also chose B.B.T. Floodlights.

Before deciding for Your Airport investigate this almost unanimous preference for

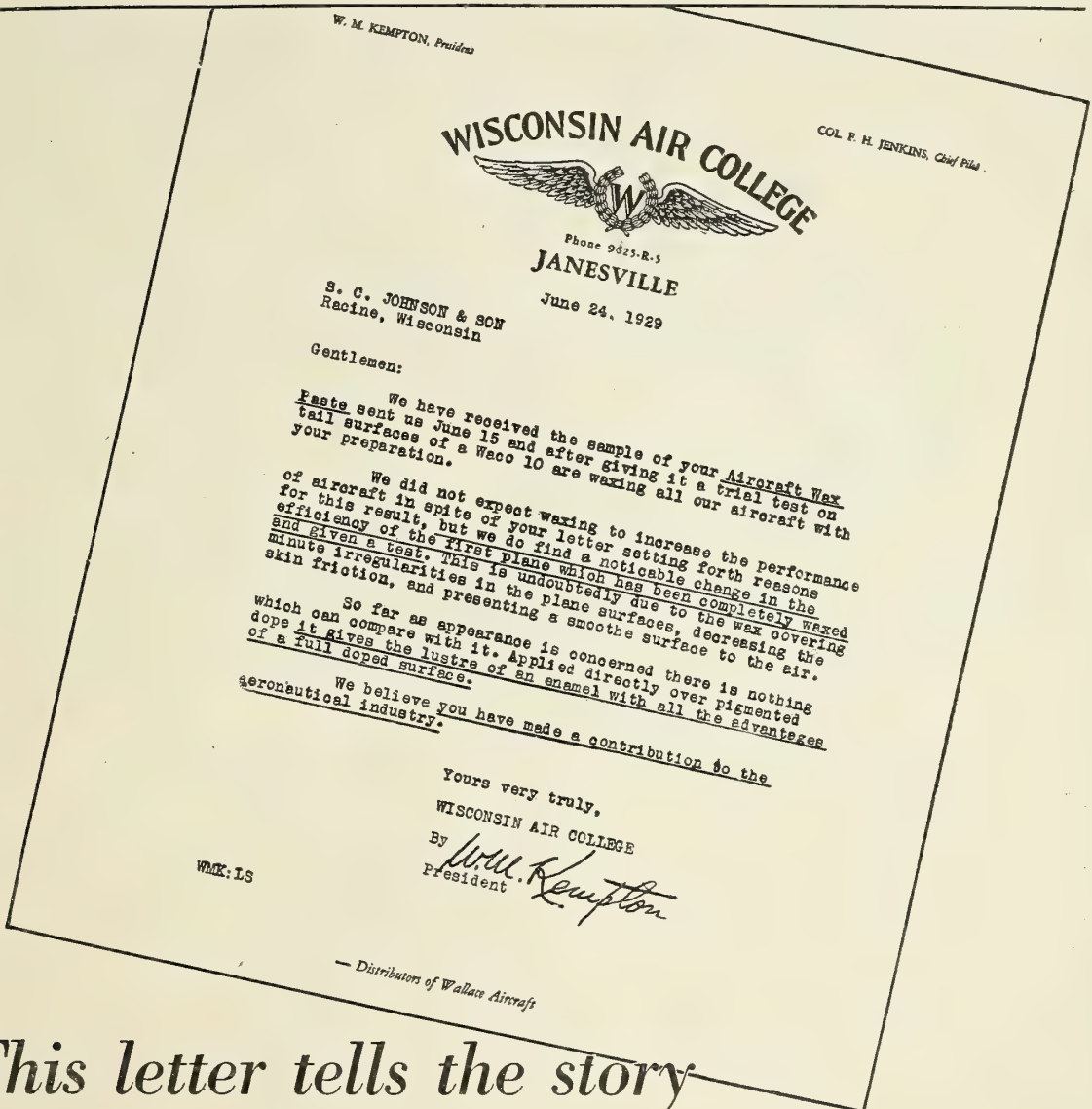


ATLANTIC BUILDING  
PHILADELPHIA

*"Aviation's Bad Weather Floodlights"*

OUR LATEST CATALOG "SAFE AIR LIGHTING" JUST OFF THE PRESS IS YOURS FOR THE ASKING

Say you saw it in AERO DIGEST



*This letter tells the story  
of waxing planes... Read it!*

Mail the coupon for a free sample of Johnson's Airplane Wax, a report on the "skin friction" tests at the Guggenheim School of Aeronautics, and full information on Johnson's Aircraft Lacquers which are made by a new process to eliminate the cracking so common in airplane finishes.

S. C. JOHNSON & SON, :: Racine, Wisconsin

Send me a free sample of Johnson's Airplane Wax, a reprint of the Guggenheim tests on skin friction, and information on Johnson's Aircraft Lacquers.

Name.....

Address.....

City... State.....



(Washington, D. C., News continued)

ington Flying Service staff and a uniform training schedule will be followed. For students desiring to take advanced training instruction will be provided in various types of airplanes including four-place cabin ships. This instruction will be open only to club members.

The Thousand-acre Airport is 20 minutes from Washington. Three runways, 3,000 feet long and 200 feet wide, have been struck off and graded and planes can land and take off in any direction.

## VIRGINIA

[C. N. SNEAD]

**A**N airport of 200 acres, which will represent an outlay of nearly a half million dollars, with a Department of Commerce rating of A-1-A, is to be located near Norfolk. The project has been completely financed, about half the capital coming from Norfolk, according to R. K. T. Larson, of Hampton Roads. The airport will have a runway 3,700 feet in one direction and 2,500 feet in the other. It will have two double hangars with sufficient accommodations for the largest planes. There also has been talk of a movement looking toward the establishment of landing development for seaplanes and flying boats.

**T**HE final step for the establishment of an airport for Roanoke was taken at a recent meeting of city council, which provided for the lease of a field, with option to purchase later if so desired. The agreement provides for the purchase of a tract of 125 acres at any time during the next five years. Since the decision to develop a municipal airport, the State Highway Department, under a law passed at the last session of the legislature, has informed Roanoke that it will allot \$1,000 toward improving the field. The site selected for the airport was recommended to the council by a Department of Commerce inspector.

**V**IRGINIA now has completed airports in the following cities: Richmond, Petersburg, Fort Eustis, West Point, Milton, Lee Hall, Hampton, Norfolk, Virginia Beach, Amelia, Crewe, Keyville, Ontario, South Boston, Martinsville, Bristol, Lynchburg, Clifton Forge, Staunton, Waynesboro, Milford, Fredericksburg, Dahlgren, Quantico, Alexandria, Arlington, Capital, Leesbury

and Winchester. Besides these airports more than a score of new ones are in course of construction at this time.

**T**HE Norfolk and Western Railway began active co-operation with the Transcontinental Air Transport on its cross country air-rail system on August 1. The new railway system gives the transcontinental service to Virginia, West Virginia, and North Carolina.

Under the new arrangement westbound travelers in these three states board the trains of the Norfolk and Western in the afternoon or night, and arrive at Columbus, Ohio, the next morning, where they are transferred to Port Columbus, the airport of the Transcontinental Air Transport. Through this arrangement residents in Virginia, West Virginia and North Carolina are afforded the same service formerly given to New York and the greater metropolitan area in the East.

**S**ECRETARY OF WAR GOOD has authorized the attachment of Captain Helm Speidel, of the German army, to a bombardment group at Langley Field for a period of one month. Captain Speidel recently arrived in the United States with Captain Warlimont, also of the German Army, for instruction in army service schools. They are the first German officers to be attached to the American army since the World War.

## MARYLAND

**W**ILLIAM A. RAY has joined the engineering force of the Berliner-Joyce Aircraft Corporation of Baltimore, Md. Mr. Ray was previously associated with Thomas Morse, the Curtiss Aeroplane and Motor Company, and the Mercury Aircraft Corporation of Hammondsport.

### First B-J Production Plane

**T**HE first airplane manufactured at the plant of the Berliner-Joyce Aircraft Corporation at Baltimore, Md., left the factory recently and is to be displayed at the National Air Races. The position of the wings is an outstanding feature of the new plane. They are on a level with the eyes of the pilot in the cockpit, rather than elevated. The new placement of the wings permits a pilot to have an unobstructed view of air traffic above him.

Instead of the tail skid, the B. J. 29-1

has a rubber wheel, connected with an Aerol oleopneumatic strut. The engine of the new craft is 17 pounds lighter than the original Cirrus engine and has the same horsepower. Its speed capacity is 105 miles an hour.

**E.** P. BOYER was elected vice president of the Alexander Milburn Co., of Baltimore, Md., at a recent meeting of the stockholders of the firm. Mr. Boyer is in charge of sales for the equipment concern.

## HAGERSTOWN

[JOHN C. MIDDLEDAUFF]

**R**EPRESENTATIVES of the Fairchild production department were in Hagerstown recently arranging for an increase in the production of the Fairchild KR biplanes. Production of Fairchild KR planes is to be increased to 75 ships per month, according to plans of the corporation. The following types of Fairchild KR planes are produced:

KR-21 A with a Kinner engine of 90 horsepower at 1,810 revolutions.

KR-21 B with a Warner engine of 110 horsepower at 1,825 revolutions.

KR-31 A with a Curtiss OX-5 of 90 horsepower at 1,400 revolutions.

KR-34 A with a Wright engine of 165 horsepower at 2,000 revolutions.

KR-34 B with a Comet engine of 130 horsepower at 1,825 revolutions.

KR-34 D with a Curtiss Challenger engine of 170 horsepower at 1,800 revolutions.

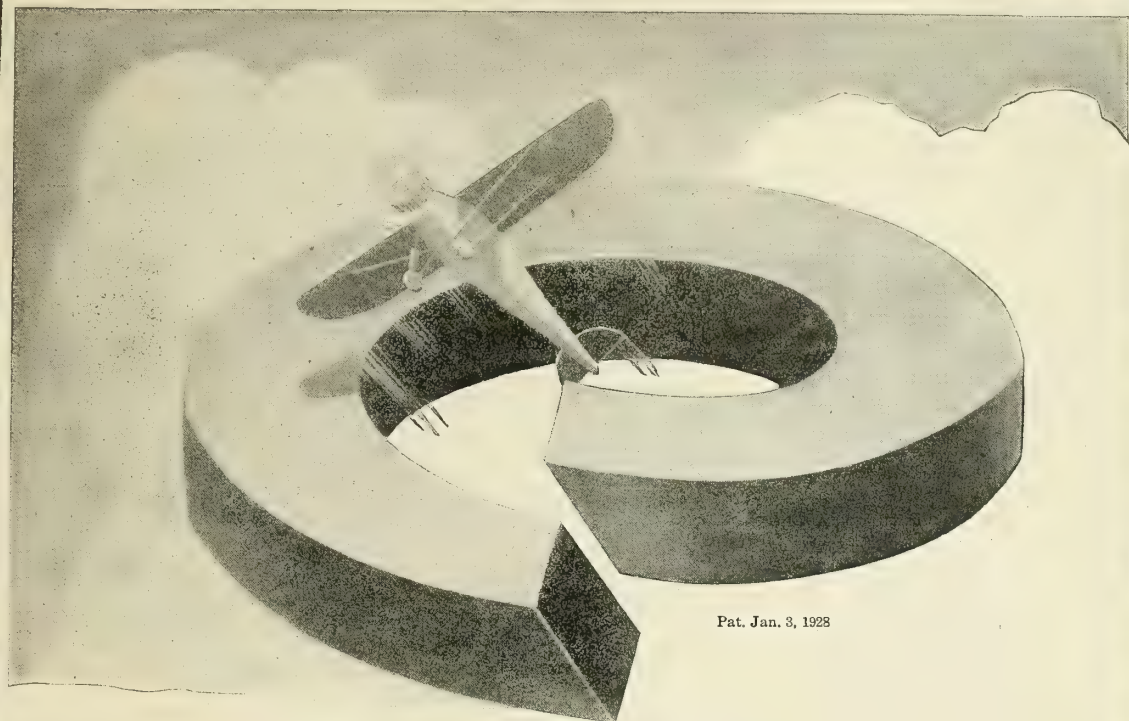
**T**HE Panghorn Sand Blast Corporation of Hagerstown is erecting a modern sand blasting plant for the Kreider-Reisner Aircraft Corporation.

**A**IR PROPELLERS, INC., of Hagerstown, is the name of the Aircraft Propeller factory organized by John Squires, president of the Kreider-Reisner Aircraft Corporation. This company will manufacture wood and steel propellers under patents held by John Squires. This corporation will have no connection with the Kreider-Reisner or the Fairchild corporation. Air Propellers, Inc., has been granted articles of incorporation by the state of Maryland. Mr. Squires, Edwin J. Smead and Leo H. Miller are the incorporators. The board of directors is composed of Mr. Squires, Mr. Smead and Howard Baker of Washington, D. C., an executive engineer. A building has been secured and machinery is being installed.

**D**R. HUGH YOUNG of Baltimore was appointed by Governor Albert C. Ritchie as chairman of the State Aviation Commission, a body authorized by the last Legislature. Captain Charles A. Masson of Baltimore, Benjamin H. Brewster 3rd of Brooklandville, Lieut. Commander De Wit C. Ramsey, U. S. Naval Academy, Annapolis, and Clarence W. Wheaton of Salisbury are the other members of the board. This commission is authorized to license fliers, airplanes and airships in Maryland, to make air traffic regulations and supervise construction of landing fields.



Head-on view of the Davis V-3 monoplane, formerly the American Moth



Pat. Jan. 3, 1928

## KANTLINKS COST MORE

**A**IRPLANE manufacturers are using Kantlinks—a high price spring lock washer. Leading manufacturers in other industries also have tested and adopted Kantlinks.

Although the cost is a little greater than that of plain coil lock washers—they are bought with the knowledge that their higher price is more than justified.

They do not interlink or tangle. They do not rust, and they have greater holding power.

In the long run Kantlinks—the higher priced—are found to be economical—and more important still, they are safe.

Prices and full information will be sent by any one of the manufacturers listed below.

*Made and sold under license by the Kantlink Manufacturers:*

The American Nut & Bolt Fastener Co. Pittsburgh, Pennsylvania	The Mansfield Lock Washer Co. Mansfield, Ohio	The National Lock Washer Co. Newark, N. J., Milwaukee, Wis.
The Positive Lock Washer Co. Newark, New Jersey	The Reliance Manufacturing Co. Massillon, Ohio	

3003

**KANTLINK** TRADE MARK **SPRING LOCK WASHERS**  
**DO NOT TANGLE DO NOT RUST**  
*THEY PAY THEIR ENTIRE COST IN TIME SAVED - SOMETIMES EVEN MORE*



## PENNSYLVANIA

**A**FTER being towed by a light Fleet sport plane to a height of four thousand feet, an open cockpit glider, constructed under the auspices of the National Gliders Association, was cut loose over the mountains at Williamsport, Pa., on July 26. After soaring for twenty-five minutes it landed at the airport. The plane was flown by Lieut. Mills and the glider by Wallace Franklin.

The glider used is of new American design with full tapered wings, forty-foot span, two hundred square foot area, and weighing two hundred and sixty pounds. The fuselage contains a single wheel with a large balloon tire for landing and airport use. The fuselage construction and tail members are of steel tubing and the wings are combined steel tube and wooden construction covered with fabric. The glider was designed and constructed by Professor R. E. Franklin and the engineering students at the University of Michigan.

**T**HE new 700-acre Dry Ridge Airport, being developed by the Main Aeronautics Company of Pittsburgh, was opened for use on August 15th. The erection of a 50 by 100-foot Blaw-Knox steel hangar is nearly completed and several paved runways are in process of being laid. The new airport is adjacent to the Lincoln Highway on the Dry Ridge just east of Greensburgh. It is reached from the Mt. Pleasant Highway. There is now an administration building

workshops, living quarters and refreshment building ready for occupancy.

The Department of Commerce has leased land for an airway beacon beside the new hangar, since this field is on the newly established Pittsburgh-Washington route. Colonel Harry C. Fry, president of Rapid Flying Service, has also designated it as an intermediate emergency field on the Smoky City-Capital Line. More than \$4,000,000 is to be expended to prepare this port for air traffic. The personnel of the Main Aeronautics Company and its subsidiaries consists of Maurice R. Scharff, president; Kit Carson, chief pilot; Richard O. Fay, chief mechanic; W. B. Phelan, sales manager; and Russell J. Brinkley, assistant to the president.

**W.** H. EMERY JR., Travel Air plane demonstrator, recently flew through a high tension cable while demonstrating his plane at Dansville, N. Y. His Standard Steel propeller cut the six aluminum strands and the steel core of the  $\frac{3}{4}$ -inch cable, and the plane continued its flight.

**R.** V. TRADER, manager of the Pittsburgh School of Aviation, has announced that his school has entered the field of nationally advertised institutions. The school previously confined its activities to the training of students in this district alone. Living accommodations are to be provided near the field for students residing outside the district, and other developments are planned for the school.

## PHILADELPHIA

[RUSSELL GARD]

**J**AMES WORK, assistant to the manager of the naval aircraft factory at League Island, was recently made vice-president and general manager of the Lockheed Aircraft Corporation.

**T**HE Philadelphia Air Service, Inc., a newly-formed concern, is temporarily operating two Challenger planes from a field on the Roosevelt Boulevard. Fred Lorillard, formerly with the Crescent Air Service, has been made field manager.

**C**ONSTRUCTION is progressing rapidly at Central Airport, Camden. Two of the new hangars at the airport are now completed, and two macadam runways, each 1,000 feet long and 50 feet wide, are practically finished. Regularly scheduled bus service from Camden to the field is now available.

**W**ITH a survey of the territory between Philadelphia and Baltimore to determine the location of a mooring mast for both transatlantic and transcontinental dirigible service now being planned, Dr. Karl Arnstein, vice-president and chief engineer of the Goodyear-Zeppelin Company, stated the possibility of Philadelphia becoming a dirigible airport. Dr. Arnstein said that while final decision on the location of a mooring mast would not be made for some time, Philadelphia (Continued on next page)

## PORTALITE



Each detachable battery operates searchlight 2½ to 3½ hours on each charging. Weight complete, 13½ lbs.

### AIRPORT LIGHTING

The Beam type Portalite provides an effective yet inexpensive emergency lighting system for all airports when their regular lighting systems fail. It saves small airports the expense of installing permanent lighting, making it possible for planes to land or take off at night. (See photo 1.)

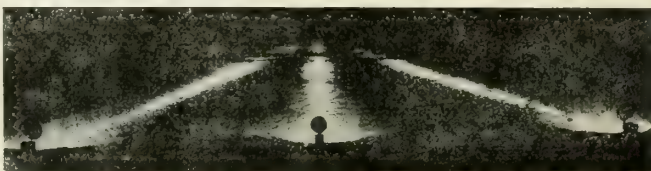
### FOR FUELING, MAKING REPAIRS OR ADJUSTMENTS

The Portalite may be supplied in a FLOOD TYPE. It will light 30,000 sq. feet at a distance of only 50 feet. Extra batteries are also a convenience.

### FOR USE ON PLANES

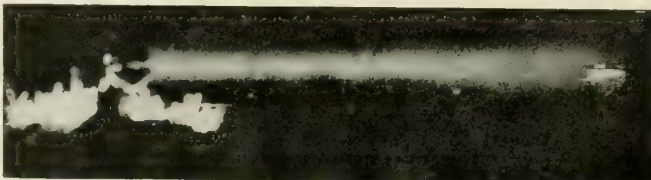
The Beam type Portalite, because of its extremely concentrated ray, makes it easy to spot land-marks or suitable landing terrain at a height of one mile. (See photo 2.) Because it operates from its own battery it is invaluable in case of forced night landings, and afterwards to make repairs, examine the ground, or to signal

## Projects Beam of 300,000 C.P. ONE MILE!



BEAM TYPE PORTALITE FOR NIGHT LANDING (Photo 1)

The apex of the light triangle formed of beams from the PORTALITE is approximately 2,000 ft. away. Irregularities on the landing field are spotted by the 300,000 c.p. beams. Pilots can accurately determine just how the ground lies in coming in between these strips. The PORTALITE is for use on fields not equipped with landing lights, or on large fields in case the lighting system fails.

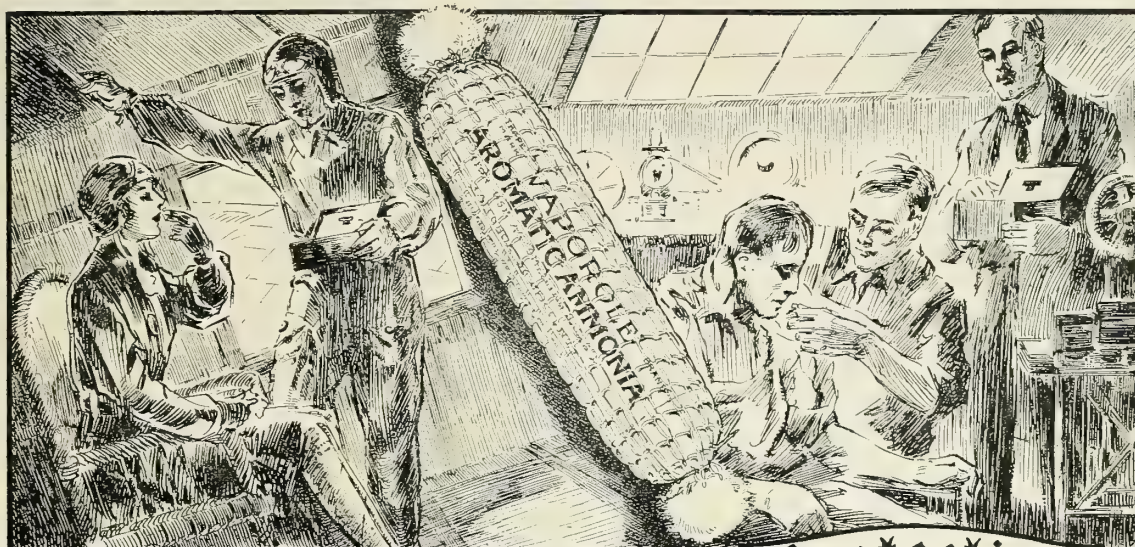


PORTALITE PROJECTING ITS BEAM ON HOUSE THREE-QUARTERS OF A MILE AWAY (Photo 2)

for help. The reflector may be detached from its battery and mounted by special bracket to under side of fuselage or it may be held in the hand when equipped with long cord. Also supplied with clamp and long cord instead of battery, and called the "Beamolite."

**THE PORTALITE COMPANY, 1109 Massachusetts Ave., Cambridge, Massachusetts**





# for Air Sickness or Shock—Aloft or Aground

IN case of air sickness, with its accompanying headache, dizziness and nausea, or shock and collapse among factory workers—wherever quick action and prompt results are vital—there's nothing as effective as

Protection

'TABLOID'  
FIRST-AID  
PRODUCTS

'Vaporole' Aromatic Ammonia—a strong aromatic solution of ammonia, in a sealed glass capsule, surrounded by absorbent material and a fine silk mesh.  
Order through your Aviation Supply House—furnished in boxes of 12. Let us know if you cannot obtain.

# 'VAPOROLE' Aromatic Ammonia

BURROUGHS WELLCOME & Co., (U. S. A.) INC.  
9 & 11 EAST FORTY-FIRST STREET, NEW YORK CITY  
Associated Houses:

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"Keep your 'Tabloid' First-Aid complete by maintaining a reserve supply of refills."



Please send me A. D.  
'TABLOID' FIRST-AID Booklet  
Firm Name .....  
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(Pennsylvania News continued)

phia should formulate its airport plans to provide for the landing of lighter-than-air craft, as well as airplanes and seaplanes.

**I**MPROVED methods for quickly increasing the speed of the rotating vanes on the Pitcairn Autogiro are being worked out in the two new ships of that type now under construction in the Pitcairn factory located at Bryn Athyn. A slanting tail, operated from the cockpit by a small lever, is expected to increase the air pressure produced by the propeller wash against the vanes, thus making it unnecessary to taxi the ship up and down the field in order to get the vanes going, as has been done heretofore. This improved type is to be entered in the Daniel Guggenheim Safe Aircraft Competition.

**G**EORGE SMITH, J. Clinton Foltz, and Don Darby are members of a recently formed sales and service branch of the Curtiss Flying Service at Philadelphia. They are to be established in the Curtiss hangar at Central Airport.

**T**HE Ludington-Philadelphia Flying Service, Inc., operator of the Philadelphia Airport, has acquired the distributorship for Travel Air planes.

**C**ONSTRUCTION of a new hangar at the William Penn Airport has been started. The rear of the old building is to be made into a repair shop.

**T**HE Ludington Philadelphia Flying Service, Inc., has opened an air transportation bureau in the Benjamin Franklin Hotel. The bureau, directed by Miss Helen Hatfield, besides furnishing data on various air routes, will make arrangements necessary for connection by plane with any regular, air, rail, or water route.

**T**HE third national meeting of the Fuel's Division of the American Society of Mechanical Engineers for 1929 will be held in Philadelphia, October 7 to 10. The program committee of the division is at work on the program under the chairmanship of F. M. Van Deventer.

**T**HE Curtis Publishing Company is making a nationwide investigation of present trends in the aviation industry and a study of how the airplane can be utilized as a time-saving factor for large business organizations. Flying in a Ford trimotored transport, a party of Curtis research men piloted by Lieutenant Adolphus W. Gorton, U. S. N., has made stops at Chicago, St. Louis, Kansas City, Clovis, N. M., San Diego, Los Angeles, San Francisco, Portland and Seattle on a national tour. Charles Coolidge Parlin manager of the division of commercial research of the Curtis publications, is in charge of the survey.

The nationwide survey will be similar in scope and thoroughness to that made by Mr. Parlin of the automotive industry in 1913. At that time he traveled more than 40,000 miles to gather his material, which was incorporated in four volumes of 2,500 typewritten sheets and statistical matter.

## PITTSBURGH

[BOB COATES]

**T**HE corporation bureau of the Pennsylvania state department on July 25 issued charters for the Main Flying Service, Inc., and the Johnstown Air Transport Service, Inc., Johnstown, Pa. The companies were chartered for the carrying of mail, passengers, freight and baggage.

**P**ITTSBURGH AVIATION INDUSTRIES CORPORATION now has the following personnel at the Pittsburgh-Butler Inc., and the Johnstown Air Transport Airport: Lieuts. C. W. O'Conner, E. C. Whitehead and E. M. Powers, who came from Wright Field and Captain C. G. Sellers and Lieut. J. C. Neale from Langley.

**C**LIFFORD BALL, operator of the Cleveland-Pittsburgh air mail line, has been named governor for the state of Pennsylvania for the National Aeronautical Association. The appointment, made by Senator Hiram Bingham, president of the National Body, carried a citation announcing that the appointment was made "in recognition of the outstanding contribution to the advancement of the science of aviation."

**T**HE opening of the William Penn Highway Airport drew a large crowd on its opening day. The field is located on the Highway six miles east of Wilkinsburg, Pa. A flying circus and stunts are included on the every-Sunday programs at this field.

**H.** RAY KRIMM is at the head of a group of business men sponsoring a new airport of 100 acres at Cumberland, Md. Associated with Mr. Krimm are: James S. Shriver, John G. Weibel, and N. R. Krimm. Flying operations at the field have been started with Waco, Challenger, Pitcairn, Fleetwing and Berliner planes.

**F**INALS in the Pittsburgh division of the National Model Aircraft Tournament were completed at Pittsburgh, August 31. Winners were: John Dowalo, Owen Cecil, Earnest Oberheim, Melvin Yohe, Gordon Glass and Edwin Swingenstein.

**C**ITIZENS of Franklin, Pa., are awaiting official sanction of McKee Field, Franklin, with a view toward backing a program for hangars and a service station at the field. Some leveling has already been done.

**R.** SMITH BLACKWOOD has been elected president of the Beaver Falls Airport Corporation. Ernest Richardson was named vice-president and Harry G. Traver, of Patterson Heights, secretary-treasurer. The association has taken an option on an airport site in Chippewa township, five miles northeast of Beaver Falls.

**P**LANs for a proposed air route from Pittsburgh to Cincinnati along the Ohio River, to include Wheeling and other river towns, were announced recently by R. W. Robbins, vice-president of the Pittsburgh Aviation Industries Corporation.

**C**APTAIN HAL BAZLEY, local distributor for Curtiss planes, has been given the franchise for all Curtiss-Wright Corporation products in Pennsylvania.

**A**UTHORITY to increase Pittsburgh's indebtedness by \$501,000 was provided in an ordinance presented to the city council recently, to take care of Pittsburgh's share in constructing and operating the Allegheny County Airport, near Lebanon Church Road, Mifflin Township.

Final passage will mean a bond issue payable in 30 installments of \$16,700 each.

**C**COUNTY solicitor W. Heber Dithrich was appointed a member of the city-county airport board of Pittsburgh by the county commissioners at a recent meeting. The city, the county and the Pittsburgh Aero Club each appoint one member to the board in the interest of Pittsburgh aviation.

**A**T a joint hearing of the Public Service Commission and the Pennsylvania Aeronautics Commission at Pittsburgh, permission was granted for the opening of the new Greensburg-Pittsburgh airport. The port is on the New York-St. Louis airline, and it is planned to obtain a mail stop at that point. No objections to the field were offered.

**P**LANs are being laid for the opening of the American Legion Airport near Connellsville, Pa. The date set for the opening is September 7.

**E**STABLISHMENT of an airline between Pittsburgh and Washington, D. C., with connections for passengers from Youngstown, Cleveland and Detroit, has been effected.

Formation of the new company, known as the Aerial Rapid Transit, Inc., with Col. C. Fry, Jr., as president, came after the completion of 15 round trips between Pittsburgh and the capital as a means of proving the feasibility of such a route. A Stinson-Detroiter was used in the inaugural service.

Other company officers include Lucius B. McKelvey, vice-president and general manager; James E. Jones, director of finance and vice-president, and Arthur J. Lynch, secretary-treasurer.

Directors include the officers and Harvey Campbell, John R. Rowland and Porter Adams.

**A**NOTHER new line which connects Pittsburgh with transcontinental air passenger service was inaugurated on August 14 by Clifford Ball, Inc. A new passenger line from Cleveland to Washington by way of Pittsburgh was opened.

The schedule on the new route is as follows: planes leave Cleveland at 12:30 p. m., arriving at Washington at 3 p. m. The stop at Bettis field, Pittsburgh, is made at 1:45 p. m.

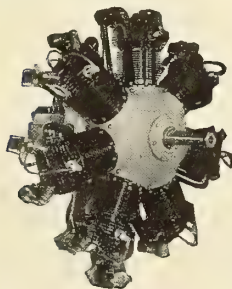
This line will connect at Cleveland with planes leaving Detroit at 10 a. m. and will also connect with a plane leaving Chicago at 7 a. m. The northbound plane on arrival at Cleveland will connect with ships for Detroit and Chicago.



The new Warner "Scarab" plant now in full operation is a model for the production of fine aircraft engines.

Completely equipped with the most modern and most efficient facilities —manned by specially trained and skilled aeronautical mechanics and engineers, the new Warner plant represents the finality in painstaking manufacturing procedure.

We believe it is fitting that the ideal light power plant should be made in the ideal factory.



110 H.P.      1850 R.P.M.  
Weight 275 lbs.

# WARNER "Scarab" ENGINES

WARNER AIRCRAFT CORPORATION . . . DETROIT, MICHIGAN

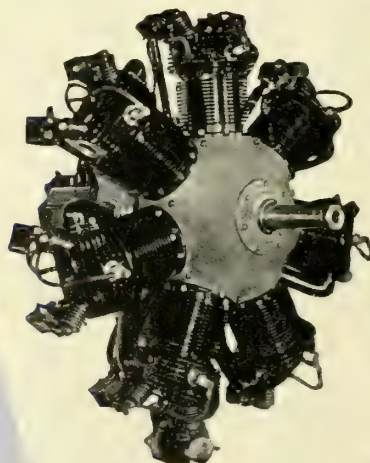


# *The* **WARNER** *"Scarab"*

Consistently performing in all parts of America, the 110 H. P. Warner "Scarab" continues its leadership as the outstanding light power plant of the industry.

This engine is invariably chosen because of its unvarying performance characteristics. For dependability, endurance and economy, the Warner "Scarab" is in a class by itself.

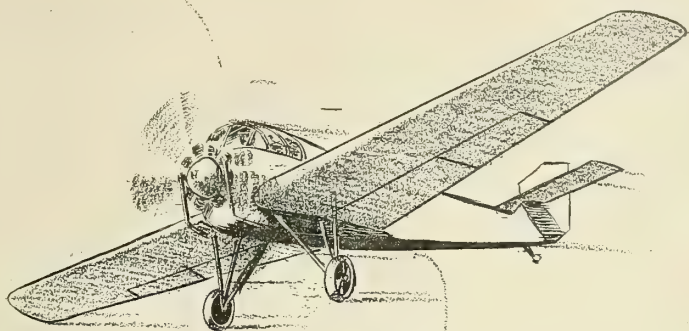
Send for complete literature.  
Specify Warner "Scarab" if you want the last word in a light, high quality design.



110 H.P.      1850 R.P.M.  
Weight 275 lbs.

## **WARNER** *"Scarab"* **ENGINES**

WARNER AIRCRAFT CORPORATION . . . DETROIT, MICHIGAN



Krect Oil is now being used extensively by both engine manufacturers and individuals and has been subjected to severe tests, both in the air and in the laboratory, and in every case from 5% to 10% more R.P.M.'s have been obtained.

Krect Oil is the correct lubricant for airplane use. Order a five gallon can, test it and convince yourself that it is all that is claimed for it.

## *The Smoothest Oil ~ ~ ~ in Oildom*

Friction in airplane engines is aviation's greatest handicap. It causes undue wear and tear on all moving parts, thereby reducing R. P. M.'s and cutting down the efficiency of the motor.

Keeping the engine in perfect condition is almost entirely dependent upon the lubricant used. Airplane engines are under their best performance when Krect Oil is used.

Krect Oil is ideal for breaking in a new motor and is the smoothest oil in Oildom for continued use, after the motor has been thoroughly broken in.

It creates a smooth, hard pellicle upon all of the wearing and bearing surfaces, which positively reduces friction from 20% to 40%, easing up the tightness of the fit, with the resultant increase in speed, smoother operation, cooler motor, less vibration and greater R. P. M.'s.

Krect Oil makes hard starting, stiff motors easy to start and the smooth, glassy pellicle is not affected by seepage of gasoline and will not break down under terrific heat.

**KRECT PROCESS CO., 6554 HAMILTON AVE., DETROIT, MICHIGAN**

# KRECT OIL

Say you saw it in AERO DIGEST



## IOWA

[R. W. MOOREHEAD]

THE Second Iowa Aeronautic Exhibition, held at the Des Moines municipal airport July 19, 20 and 21, was successful despite a smaller attendance than was present at the first exhibition last year. Buck Freeman, manager of the show, estimated the attendance for the three days to be between 30,000 and 35,000. More than fifty planes competed in the races.

With good weather, the show's program was carried out in every detail. The features of the program included formation flights, thirty-mile speed race, balloon busting contests, parachute drops, dead stick landing contests, pony express eighteen-mile race and passenger flights. The show was sponsored by the Iowa chapter of the National Aeronautic Association, the Greater Des Moines committee and the Junior Chamber of Commerce.

W. FISKE MARSHALL of Waterloo has been elected president of the Iowa Air Tour, succeeding George Yates, who was president of the second annual air tour held recently. John Walton remains vice-president and Merrell Boyce secretary.

IOWA STATE COLLEGE, Ames, Iowa, will start a course of instruction in aeronautical engineering during the coming school year, it was recently announced by Major Wm. A. Bevans, of the college. The

enlarged work in the mechanical engineering department will point toward qualification of men upon graduation as junior aeronautical engineers in government positions or in similar positions with private concerns.

Courses will be given in aerodynamics, airplane design, engines and structures. Students will have two planes furnished by the government for use in their work. Several airplane engines, both air and water cooled, a full set of all instruments used in modern flight, a number of propellers, and additional equipment has been supplied to the college from Wright Field, Dayton, Ohio. A wind tunnel for use in studying model planes is also under consideration. A part of the course in aeronautics will be design and construction of a small plane by junior and senior students.

C. F. DELASAUX of Chicago has been appointed by the Department of Commerce as government aviation inspector for Iowa and South Dakota. Mr. DeLasaux will establish headquarters in the federal building, Des Moines.

A SUM exceeding \$276,559 will be spent in Iowa during 1929 to improve airports, install lighting systems and increase restaurant and hotel facilities for airmen, it was learned from replies to a questionnaire sent recently to civic service bodies throughout the state.

The estimate represents the plans of 21 Iowa cities, with Iowa City heading the list. At an expense of \$70,000 the Iowa City field

will be enlarged to 190 acres, giving a full half-mile runway in each direction. A new \$7,000 passenger station is to be constructed, and in addition it is planned to construct a modern drainage system for the field, and install new border lights.

Council Bluffs, Iowa, plans to spend \$50,000 for purchasing land for a new municipal airport and making improvements.

Sioux City, Iowa, has budgeted \$35,000 for improvements to its field necessary to gain an A-1 rating. The field is to be lighted with flood, boundary, ceiling, revolving and direction lights.

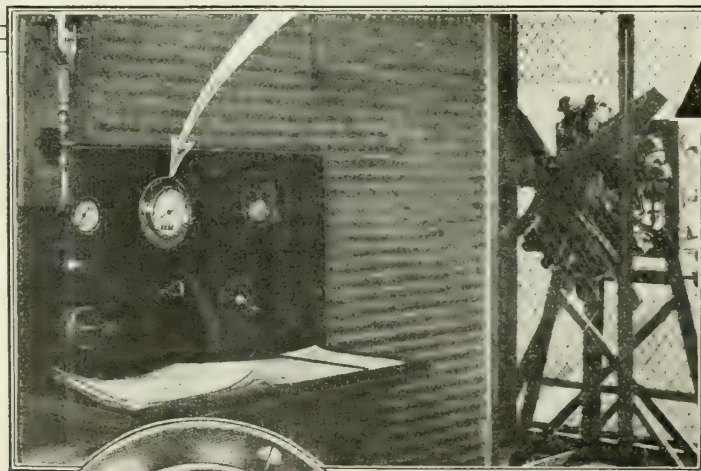
Cedar Rapids and Waterloo will each spend \$20,000 on their airports. At Cedar Rapids a new machine shop and a waiting and mail building will be added to the field. At Waterloo the field will be re-surfaced and cinder runways will be installed.

Des Moines plans to continue improvements during the remainder of the year, with an expenditure estimated at \$15,000. Hotel and restaurant accommodations have already been established.

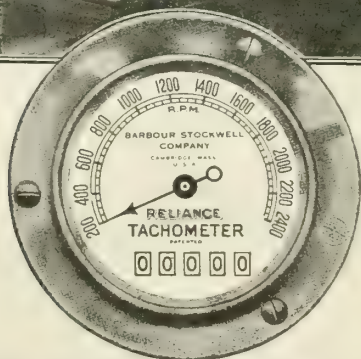
HARRY G. SMITH left Indianola, Iowa, recently for Shanghai, China, where he will superintend the establishment of an air mail for the Chinese nationalist government. The system will link the republic with established routes along the Mediterranean and through European countries.

Mr. Smith was chosen for the project by C. M. Keys, head of the Curtiss aeronautical interests in this country. Headquarters will

(Continued on next page)



One of the numerous  
Le Blond Test Stands



## Le Blond test stands

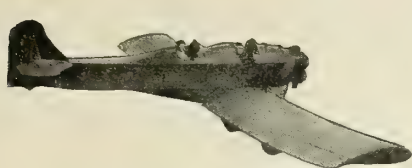
where accuracy and precision are vital, are Reliance equipped—sure-fire check on engine performance.

All of America's leading engine builders use Reliance on test stands.

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Cambridge, Massachusetts

# RELIANCE TACHOMETERS



The Barling  
NB-3 Monoplane

# Another WORLD'S RECORD for Light Planes

again demonstrating the  
Unequaled Stamina of the  
**LEBLOND "60"**

From Brownsville, Texas to Winnipeg, Manitoba, a distance of 1650 miles in 16 hours is a new world's non-stop long distance record for light planes established by D. S. "Barney" Zimmerley in his Le Blond powered Barling NB-3 Monoplane.

Zimmerley took off from Brownsville at 2:45 A. M. with 100 gallons of gasoline and 4 gallons of oil. Zimmerley landed at Winnipeg at 6:45 P. M. having travelled 1650 miles, beating the previous light plane distance flight by 678 miles.

In this record breaking flight only 88 gallons of gas and  $2\frac{1}{2}$  gallons of oil were consumed.

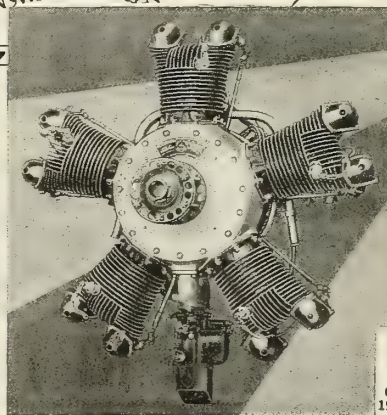
Leaders everywhere are turning to the Le Blond "60." Its acknowledged stamina, foolproof assembly, and easy accessibility for replacements or repairs, combine to make it the peer of aircraft power plants within its scope of application, for student training, sport or commercial use. Write for descriptive folder.

THE LE BLOND AIRCRAFT ENGINE CORPORATION  
CINCINNATI, OHIO, U. S. A.

*THE LE BLOND "60," with which this new long-distance record for light airplanes was established, is the first and only aircraft engine in its class to pass successfully the difficult United States Navy 50-hour test.*



"Barney" Zimmerley who achieved international prominence in establishing the world's distance record for light planes.



A. T. C.  
No. 12  
Approved  
Rating  
65 H. P. at  
1950 R. P. M.

# LEBLOND AIRCRAFT ENGINES



(Iowa News continued)

be at Shanghai, from which city Mr. Smith will supervise the construction of airports, select pilots, mechanics, engineers, airport managers and office staffs. Mr. Smith expects to use a good many young Chinese airmen for flying positions, although he is also selecting pilots in this country.

THE Baxter Flying Service, Inc., with authorized capital of \$50,000 has been organized at Sioux City, Iowa. D. K. Baxter is president of the company, which was organized for the purpose of training students, conducting a flying school, carrying passengers and general commercial activities. Earl Wilson will be instructor of the school, which will be conducted at Rickenbacker airport. The company has just added a Curtiss Fledgling to its other equipment.

This is the third flying school in Sioux City. The other schools are maintained by the Kari-Keen Aircraft, Inc., and the Hartford Tri-State Airlines, Inc.

## MISSOURI

PRODUCTION of the Barling NB-3 monoplane, manufactured by the Nicholas-Beazley Airplane Co., Inc., of Marshall, Mo., is going forward at the rate of one plane a day according to officers of the organization. The factory force of 150 men is being increased to take care of standing orders, and, with the completion of a third unit of the plant shortly, production will be increased to ten planes per week.

U. F. Diteman will leave the first of November for an extended tour of Central and South America where he will contact with leading houses in Latin American countries for the purpose of establishing representation for the Nicholas-Beazley export group. Mr. Diteman will fly a Barling NB-3 monoplane powered with a Warner Scarab motor. The Nicholas-Beazley Export Group, which represents leading manufacturers in this country of non-competing lines of aeronautical products, will have as its representatives in foreign countries established houses, who through a separate de-

partment will act as a servicing headquarters for products manufactured by concerns comprising the group.

Passenger service from Marshall, Mo., and points nearby has been inaugurated by the Nicholas-Beazley Airplane Co., Inc., to connect with airlines in Kansas City and St. Louis. This service enables persons living in nearby towns to be picked up at the nearest landing field and carried to their destination.

APPROVED Type Certificate No. 174 has been issued by the Department of Commerce, for the Barling NB3 monoplane, manufactured by the Nicholas-Beazley Airplane Company, Inc., of Marshall, Mo. The plane, which is the only three-place ship to be licensed with a sixty horsepower engine, is one of the first to be approved under the new Department of Commerce requirements which went into effect July 1st. With the completion of a third unit of the factory, production of the plane will be increased to one plane a day.

The Barling NB3, powered with a LeBlond 60 horsepower engine, was used by Pilot Zimmerley recently on his flight from Brownsville, Texas, to Winnipeg, Canada, when he set a new non-stop long distance record for light planes.

A LARGE order for aeronautical parts and supplies was received recently from Forea Publica, the Brazilian military forces at Sao Paulo, Brazil, by the Export Department of the Nicholas-Beazley Airplane Co., Inc., of Marshall, Mo., according to W. F. Potter, export manager. The order comprises airplane engines and a comprehensive supply of parts, tubing and accessories. Considerable activity is being evidenced in the South American field by orders recently received, Mr. Potter asserts.

THE "On to Des Moines" race, held in connection with the recent Iowa Aeronautics Exposition in Des Moines, was won by Dwight Zimmerley, piloting a Barling NB-3 monoplane. Zimmerley is a test pilot for the Nicholas-Beazley Airplane Company, Inc., Marshall, Mo., makers of the Barling plane. He started from St. Louis and made the distance of 273 miles to Des Moines at

an average speed of 101.3 miles per hour. Zimmerley is the pilot who recently established a new world's distance non-stop record for light planes when he flew a Barling from Brownsville, Tex., to Winnipeg, 1,650 miles.

### Fairfax Airport Dedicated

FAIRFAX AIRPORT, Kansas City, was officially dedicated August 3 and 4, with a celebration that attracted more than a half million persons to the airport in the two days. The formal dedication was the occasion of the laying of the cornerstone to the new administration building, being erected by the Fairfax Airport Corporation, owners of the field. Governor Clyde M. Reed of Kansas officiated at this ceremony. Senator Henry J. Allen of Kansas and former Senator James A. Reed of Missouri also spoke at the cornerstone ceremony.

A traffic check the second day of the event showed that 86,447 automobiles entered the airport between 7 a. m. and 7 p. m. A continuous program of aerial maneuvers and stunts filled the celebration.

Franklin Moore, vice president of the Fairfax Airport Corporation, and general manager of the field, arranged the celebration. A system of amplifiers was used throughout the two days to keep the crowds informed. Most of the buildings under construction at the airport now will be completed by October 1.

Three new hangars and the administration building of the Curtiss Flying Service and the Universal Aviation Corporation were completed recently at Fairfax Airport. Another large structure is being erected by the airport organization for airplane storage and salesrooms. Foundation work on the new administration building is under way. This building will be the key structure of the field. It is being erected at the southwest corner of the airport, and the tower of the building will be the control panel that will operate all the aerial operations on the field. All the signals and lights will be operated from the tower.

On the first floor of the administration building will be waiting rooms for passenger traffic, a dining room, kitchen, ticket office,

(Continued on next page)



Fairfax Airport, Kansas City, as it appeared from the air on the day of its dedication



# LOOK into the HIDDEN VALUES

in every plane equipped with

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albumen  
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Corp., Ltd., Toronto, Montreal,  
Winnipeg, New Glasgow



See HASKELITE in the booth of any leading aircraft manufacturer at the Cleveland Exhibition, or visit us in Booth No. 200, or our headquarters at the Hollenden Hotel





(Missouri News continued)

cigar stand, soda fountain, barber shop, telephone and telegraph service stations and depots for handling air mail and express. The second floor will have a club room for pilots, administration offices, hospital, weather bureau, and offices for the United States Department of Commerce representatives.

Near the administration building will be the 70 room hotel of the United Air Industries. This building will have a drug store, shops and recreation rooms on the ground floor. On the north end of the field the Curtiss Flying Service is erecting an airplane repair depot. This organization has one such depot on the west coast, another in the east, and the central station will be at Fairfax.

Concrete-edged directional runways will soon be ready at the field. These will be laid so they can be extended on to Goose Island, the annexation of which is planned as a part of the field development. The present field has 257 acres. The annexation of Goose Island, which is in the Missouri River, would add more than 500 acres to it.

The Rearwin Airplanes, Inc., factory building is being pushed at the airport. With the purchase by the American Eagle Aircraft Corporation of the Wallace airplane plant, a new factory to house that industry will be erected at the field.

THE Ryan Aircraft Corporation of Anglum, Missouri, recently announced the appointment of Pickwick Airways, Inc., operators of the Pickwick Latin American Airways, Inc., as distributors for Ryan planes in Mexico.

## KANSAS CITY

[H. H. JAMES]

THE Southwest division of the National Air Transport, Inc., has made a new 30-day record of not having a mechanical failure in that period and its planes have withstood the different weather conditions. The record applies to the night schedules as well as the day. Throughout the 30-day period the N. A. T. planes have carried an average of 204 pounds of air mail, originating in Kansas City. The southbound planes have carried about 65 pounds of this mail, the balance going on the eastbound planes.

NIGHT fliers coming into Kansas City now have a new guide post. A large glass ball on top of the United States Cold Storage Company's Kansas City plant, has been illuminated with the installation of red neon lights. The ball revolves and, with the new lights, pilots report that it is visible many miles away. The plant is located only a few blocks from the municipal airport.

THE north and south field for landing and take-offs at the Kansas City municipal airport is being enlarged to give it a length or more than one mile. This will eliminate the hazards of taking off because of the nearness of the field to the Missouri River and the central district of Kansas City.

THE Rearwin Airplanes Co., Inc., of Kansas City, will have planes in two national races this month. R. A. Rearwin, president of the company, has completed arrangements for two Ken-Royce ships to


compete in the races. One ship will be piloted by Miss Ruth Nichols in the woman's division of the race from Santa Monica, Calif., to Cleveland, starting August 19. George Halsey, who piloted a Ken-Royce in the recent Kansas air tour, winning first in the Class B event, will enter the Miami-Cleveland race, which starts from Miami August 24.

WORK is going forward rapidly on the new building of the National Air Industries at Fairfax Airport, Kansas City. Excavation for the basement has been completed and foundation work is now in progress. The building, when completed, will house the Beacon Airways of America, the Consolidated Air College and other subsidiary companies of the organization.

THE new passenger station at the Kansas City municipal field will soon be ready for service. Construction work is being pushed as rapidly as possible. The building, a two-story brick structure, which will serve as a passenger station with waiting rooms, will also have office rooms, quarters for pilots and field administrative offices. Rooms also will be available for renting to persons overnight.

THE Cook Glider and Sailplane Co., has been formed to manufacture gliders and operate a glider school, with factory and school at the Fairfax Airport, Kansas City. The concern is a \$50,000 corporation with Clarence N. Cook as its head. Associated with him in the company are Franklin

(Continued on next page)



Wilson Rolling Steel Doors In San Francisco Airport

## ROLLING STEEL DOORS

### Dispatch Your Ships On Time!

**.... pressing a button does the work**

By merely pressing a button, the largest hangar opening can be cleared in three and a quarter minutes.

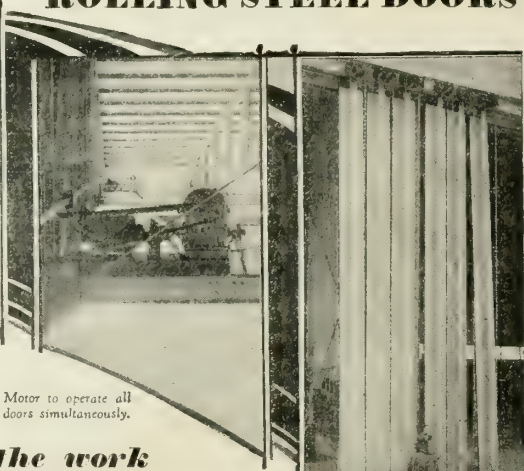
Wind, rain or snow will not affect their operation.

Simplicity of operation, plus rugged construction, assure years of maximum service.

Used successfully ever since hangars became a necessity.

A product backed by over 50 years experience.

For convincing details send for Catalog No. 6.




Motor to operate all doors simultaneously.

**THE J. G. WILSON CORPORATION**

11 East 38th St., New York City

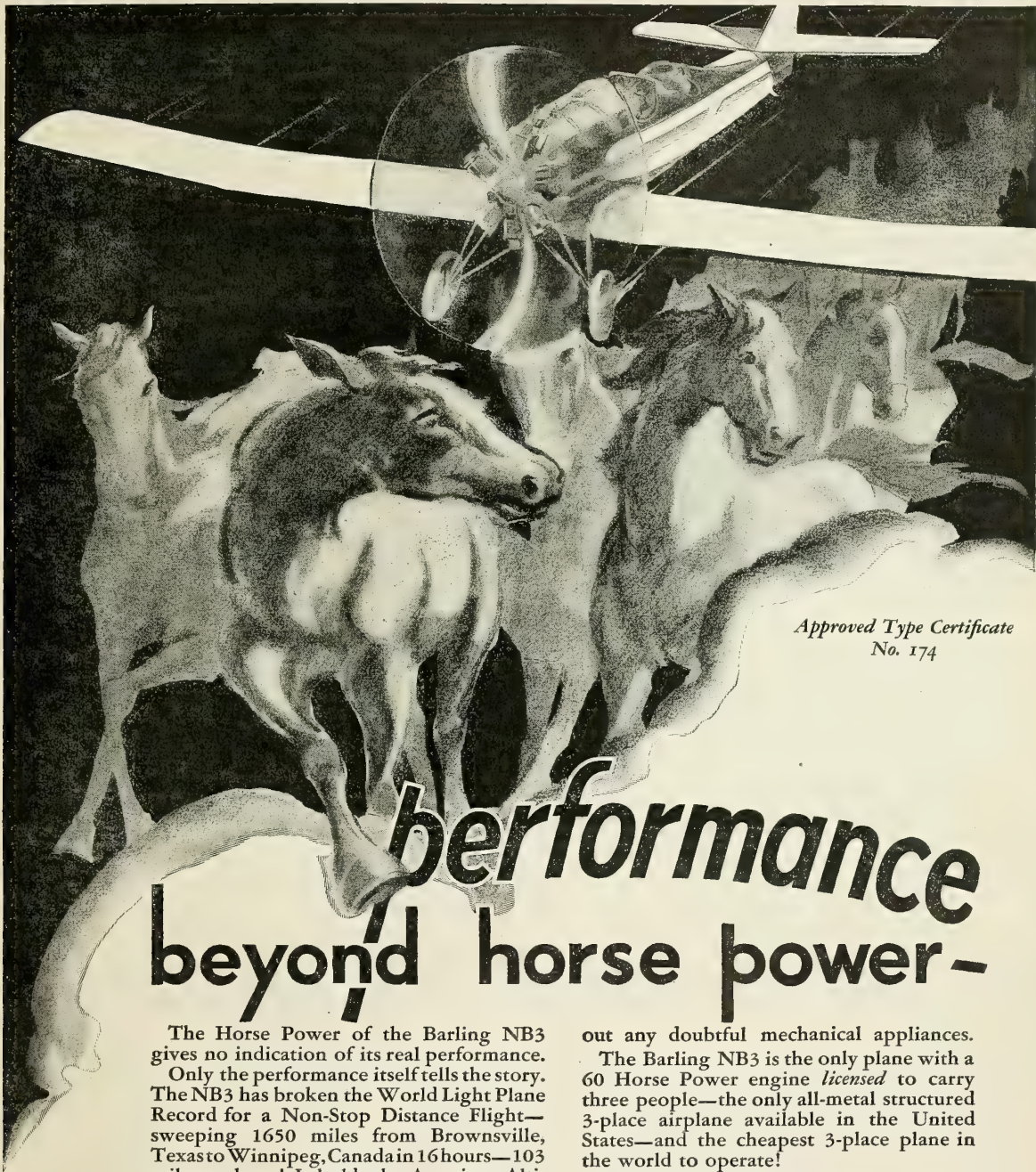
Offices in all Principal Cities



Posts swing back to provide complete clearance of space.

**OVER FIFTY YEARS IN BUSINESS**





Approved Type Certificate  
No. 174

# performance beyond horse power—

The Horse Power of the Barling NB3 gives no indication of its real performance.

Only the performance itself tells the story. The NB3 has broken the World Light Plane Record for a Non-Stop Distance Flight—sweeping 1650 miles from Brownsville, Texas to Winnipeg, Canada in 16 hours—103 miles an hour! It holds the American Altitude Record for Light Planes—20,862 feet!

And, unlike most light planes, the Barling NB3 is endowed with inherent stability. Steadiness and Non-Spin features are engineered into the plane—assuring safety with-

out any doubtful mechanical appliances.

The Barling NB3 is the only plane with a 60 Horse Power engine *licensed* to carry three people—the only all-metal structured 3-place airplane available in the United States—and the cheapest 3-place plane in the world to operate!

Our new Sales Plan is in effect. Factory branches are established—our quick-delivery problem is solved. Direct factory assistance to dealers is an exclusive feature! Write for our profitable Dealer Plan.

NICHOLAS-BEAZLEY AIRPLANE CO., Inc.  
*Manufacturing Division . . . Marshall, Missouri*

# BARLING NB3

Mon  plane



(Missouri News continued)

Moore, Arthur Hardgrave, Lou E. Holland, Guy E. Stanley, James H. DeCoursey, M. L. Breidenthal and Dr. C. C. Nesselrode.

Two types of gliders will be produced. One will be a primary training ship, with a wing spread of 35 feet of the parasol type, and open bridge fuselage, weighing 250 pounds. The second type will be a sport glider with covered fuselage. It will weigh 200 pounds. Later, it is planned to manufacture a soarplane for the use of expert glider pilots.

THE Kansas City Flying Club, local chapter of the National Aeronautics Association, has opened a drive for new members. The club, organized about a year ago, has a membership of more than 300.

BEACON AIRWAYS OF AMERICA, of Kansas City, has been appointed distributor of the Great Lakes Aircraft Corporation of Cleveland for western Missouri, Kansas and Oklahoma. The Beacon company placed an initial order with the company for forty planes.

AN air tour of seven states to last a week, has been arranged for the latter part of August by the Kansas City Chamber of Commerce. More than fifty planes are expected to participate. The tour is intended to call attention of the Middle West to the development of the aviation industry in Kansas City. Northwest Missouri, Iowa, Kansas, Nebraska, Colorado, Oklahoma, Arkansas and Southwest Missouri will be visited. Another purpose of the trip will be to impress on the smaller cities and towns of the territory the importance of having well marked airports and good landing fields.

A NEW sales policy has been announced by Arthur Hardgrave, president of the Inland Aviation Company, makers of the Inland Sport monoplane. Mr. Hardgrave announced that the sales policy of the company would be directed to the individual, rather than to flying concerns, pilots, schools or air lines. The Inland Sport has been under development for a year with ten ships built in that time. Quantity production will start soon. A factory is to be erected at the Kansas City municipal airport.

#### Fly-It Yourself Service Inaugurated

THE Saunders Fly-It-Yourself Company, an outgrowth of the Saunders Drive-It-Yourself Company, was announced recently at Kansas City, Mo. Planes will be rented to anyone holding a limited commercial pilot's license, or any license of higher grade. Those without pilots' licenses will be able to secure the services of qualified pilots to fly the planes for them.

Entering the air industry following thirteen years of conducting a similar business in the motor car world, the Saunders organization has contracted for the purchase of 100 Arrow Sport biplanes. The company's base of operations will be at Fairfax airport, using the south half of the airport company's new sales and service building for the field headquarters.

A FACTORY contract to permit installation plan aircraft sales was recently signed by E. E. Porterfield, Jr., president of the American Eagle Aircraft Corporation of Kansas City, and T. T. Hildebrandt, manager of the aeronautical division of Commercial Investment Trust, Inc., of New York City. A down payment of a third of the total sum involved in the airplane sale, which includes insurance charges, is required. The remainder is payable in twelve installments. The service charge on the deferred payments is 10 per cent.

#### American Eagle Enlarges Distribution System

THE American Eagle Aircraft Corporation recently opened a factory branch at Love Field, Dallas, Texas. Charles E. Blosser will supervise the branch which will maintain complete stock of American Eagle aircraft. It is planned to place six other factory branches at strategic points throughout the United States so that service and sales calls can be answered at any point in the country within five hours after receipt.

Twenty-seven new distributors and dealers have been added to the American Eagle list of representatives throughout the United States. Factory branches are being opened in Newark, N. J.; Chicago; Minneapolis; Atlanta; Dallas; Glendale, Calif., and Portland, Ore. Following is the list of the new distributors and dealers: Arizona Airlines, Inc.; Phoenix, Ariz.; E. H. Cash, San Bernardino, Calif.; Copper State Airways, Inc., Jerome, Ariz.; B. T. Flannery, Chanute, Kans.; Gottberg and Son, Columbus, Nebr.; Binghanton Flying Service, Inc., Chenango Bridge, N. Y.; Ozark Flying Academy, Silcan Springs, Ark.; J. B. Pundt, Santa Barbara, Calif.; Roosevelt Motor Sales Co., Lombard, Ill.; Yellowstone Airways, Inc., Billings, Mont.; W. U. Young, Gary, Ind.; Ray Schenck, Clarinda, Ia.; Puritan Air Transport, Boston; Joel Stewart, Grinnell, Ia.; Fred Oehler, Coffeyville, Kans.; Akron Airlines, Inc., Akron, O.; P. G. Stoneman, Willoughby, O.; F. G. McMahon, Cleveland, O.; N. E. Kessling, Anderson, Ind.; J. F. Hall, Kirkwood, Ill.; Great Western Air Sales Corp., Tulsa, Okla.; Mutual Flyers Club, Inc., Lincoln, Nebr.; Ray Shifflett, Mangum, Okla.; Kindred Aviation School, Enid, Okla.; Air Service, Inc., Rutledge; Central Montana Airways, Lewiston, Mont., and Frank E. Crymble, Bangor, Me.

Plans for the organization of American Eagle Aircraft Corporation subsidiaries in Texas and California were also announced recently by Mr. Porterfield. Incorporation of these companies is the initial step in the establishment of factory branches at Dallas and Glendale, Cal.

The Dallas factory branch is to be located at Love Field. A hangar is to be used, one end of which will be remodeled with plate glass windows for displaying American Eagle planes. The California factory branch will be located on the Grand Central Air Terminal in Glendale.

Jack Morgan of Dallas, Tex., has been selected to supervise the Dallas factory branch of the American Eagle organization. Bert Purnell will serve as pilot-demonstra-

tor for the Dallas branch, and Addison Noever will be clerk.

The factory branches will be equipped to respond to service and sales prospect calls at all times, and a sufficient number of the branches will be launched to permit response to these calls in any section of the United States within four hours' flying time.

## ST. LOUIS

[A. W. LEAGUE]

THE St. Louis Aircraft Corporation has received an approved type certificate for its two-place monoplane, the *Cardinal*. In its test flight the *Cardinal* attained an altitude of 12,800 feet, and met load, stability, and all other requirements successfully. At the present time the St. Louis Aircraft Corporation is turning out three planes a week, but plans call for a production schedule of one plane a day. An assembly plant is soon to be erected at Lambert Field. The *Cardinal* is powered with a LeBlond 60, LeBlond 90, or a Kinner engine. W. C. Benton of Culver City has the distributorship of the plane for the Pacific Coast.

#### Developments at Lambert-St. Louis Field

BOND issue improvements at Lambert-St. Louis Field are under way. Grading, drainage installation, and the diversion of Cold Water Creek, have all been started, as well as work on the 200-foot concrete apron in front of the hangar.

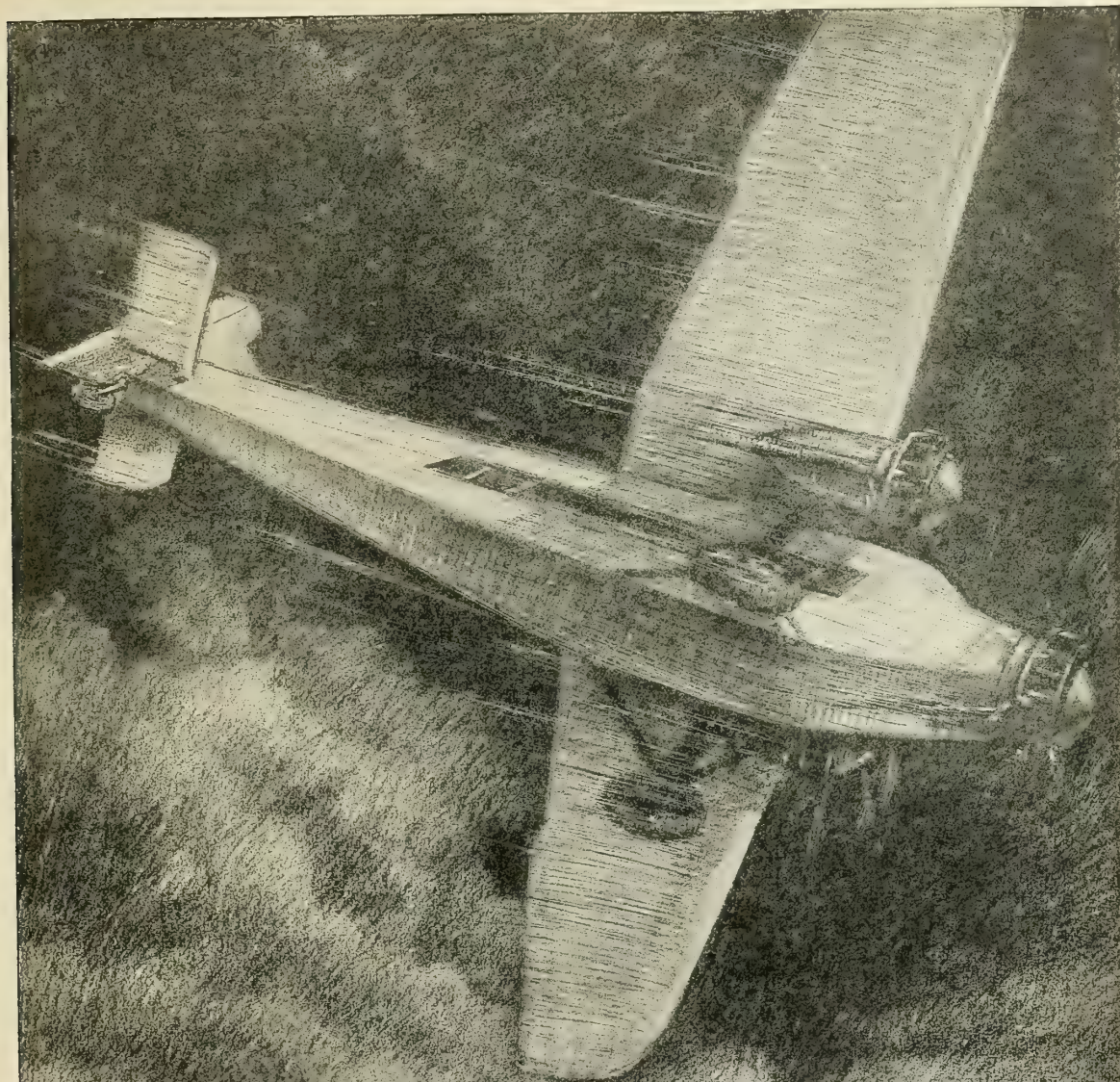
The grading work was started at the extreme southeast corner of the airport, where a slope is being leveled. The main entrance to the airport will be located there subsequently. Several sections of the concrete apron have been laid. An experimental runway 100 feet wide following a path across the field from southwest to northeast is about complete. The material used is crushed rock and Tarvia. The effects of frost on the surface will be observed closely with the object of selecting a suitable material for all the eight runways that are to be built under present plans. Contractors have announced plans for working at night in order that the projects may be completed within the four months specified in the contract.

Approximately \$700,000 will be spent for extending the Curtiss-Robertson plant at Lambert-St. Louis field. The company recently leased 13 acres adjoining the present plant to provide for additions. Production is now at 75 planes a month, and it is planned to increase this. Up until August 7, the first anniversary of the opening of the plant, the total number of planes turned out by the Curtiss plant was over 500. Ten Challenger-Robins are being made at the factory for air mail and passenger service in China. Orders for 60 Challenger-Robins, totaling \$450,000, have been received since the endurance flight of O'Brine and Jackson.

The Department of Commerce has issued Approved Type Certificate number 160 for the Curtiss Thrush which is to be made in the new plant now being constructed by the Curtiss-Robertson Company at Lambert-St. Louis Field.

(Continued on next page)





*Where the bearings*  
**MUST NOT FAIL**

**NORMA-HOFFMANN BEARINGS CORPORATION, STAMFORD, CONN, U.S.A.**



(Missouri News continued)

**P**ROJECTS for two new airports near St. Louis have been announced. The Universal Aviation Corporation, operating mail and passenger lines to Chicago, Kansas City and Omaha, has obtained options through an agent on 610 acres fronting on and including a portion of Horseshoe Lake. This location will bring the air mail terminal within 20 minutes of downtown St. Louis. The leasing of a portion of Horseshoe Lake indicates the possible use of amphibion craft as well as land planes. The other project embraces Cabaret Island in the Mississippi River near St. Louis. An option to purchase this 2,000 acres of land for \$300,000 has been obtained for a new airport.

**I**NSTALLATION of machinery and equipment in the new Von Hoffmann mechanics school building, recently constructed at Lambert-St. Louis Field, has been completed. The Von Hoffmann Aircraft Corporation has been appointed agent for the Stinson Junior, the Avro Avian and the Cardinal planes. It is also exclusive agent for the LeBlond motor used in the Cardinal.

**A**N advanced course in navigation for aviation students and transport pilots which will give them a thorough knowledge of the basic principles of navigation, including both land and sea, has been inaugurated by Universal Aviation Schools. The course will cover approximately 48 hours of lecture work. Lieut. John W. Geppert, U. S. N. R., has been selected by Universal to conduct the course, and he will personally direct the advanced navigation course in the St. Louis-Universal Flying School.

An air ticket office and waiting room in St. Louis has been opened by the Universal Aviation Corporation. Information on arrivals and departures on any air line in the country will form one of the free services of the office. Through rail connections, Universal issues more than 65 different types of tickets which will carry passengers by air and rail to every part of the country. Stanley R. Peltason, A. J. Garipey and C. H. Frederickson will form the personnel for the ticket office.

**A**PPROVAL of the Parks Air College by the Department of Commerce as a Transport School makes the East St. Louis school the only institution with such a rating in the middle west and one of three in the United States that has the classification. To qualify for the rating, Parks Air College was thoroughly examined by Inspector J. A. Koerbling, who gave instructors written and flying examinations, and made a thorough survey of the school's courses, flying equipment and facilities for teaching. In the examinations every instructor qualified for the Department's new instructor's license. The Department of Commerce has awarded an approved type certificate to the Parks P-1, a three-place open biplane manufactured by Parks Aircraft Incorporated, in a factory on the Parks Airport. The P-1 is powered with a 150-horsepower Axelson engine.

**T**O encourage the establishment of commercial aviation in Guatemala, the Guatemala government has recently started a passenger and mail air line between Peten and Guatemala City, according to Col. Miguel Garcia Grenados. Before the establishment of this service the trip which the planes make in two hours, took 24 days through the jungle. Ryan planes are used on the route.

**T**HE Ryan Aircraft Corporation recently announced the appointment of the Tropical Airways Inc., of Daytona Beach, Florida, as Ryan distributors for the State of Florida. The Company has ordered Ryans for the establishment of airlines between Miami and Jacksonville, and Daytona Beach and Tampa. The Miami line will use pontoon equipped Ryans, and the Tampa line the standard Ryan brougham.

#### Acts to Preserve Lambert-St. Louis Field

**T**O save Lambert-St. Louis Flying Field, the city of St. Louis has offered free to the St. Louis County Court a deed to a 100-foot right of way for the proposed Cold Water Creek drainage ditch closer to the eastern edge of the field. The plans originally called for a ditch diagonally across the field which would have ended its use for an airport and rendered the land virtually useless.

The city also proposes to dig the detour ditch at its own expense and to present it to the County Court, thus saving the taxpayers in the drainage district the cost of this section of the drainage system. The ditch the city proposes to build will be 50 per cent more efficient than the channel previously planned. The cost to the city for digging the channel will be \$75,000.

**J**OSEPH G. HARDY has joined the engineering staff of the Ryan Aircraft Corporation. Mr. Hardy was formerly with the Douglas Aircraft Company.

**A** YEAR-AROUND airplane service is maintained by the Yukon Airways and Exploration Company in Alaska, between Whitehorse, Dawson and Mayo. The concern uses four Ryan planes in its transportation and exploration services.

**U**NDER a new expansion plan for Parks Air College, announced recently by Harry P. Mammen, president, that school will open branches at seven points in the United States in addition to the central school at Parks Airport.

Arrangements have been completed for opening a school in central Texas. Negotiations are also proceeding for opening a school in New Jersey and another school in northern Ohio. Other locations for which preparations are being made are Southern California, and a town near Boston, Mass. It is also planned to start a school in the Northwest. In each case the schools will be located on privately owned fields. Parks Air College is the only school in the Middle West thus far to be licensed by the U. S. Department of Commerce as a Transport School and is one of only three schools in the country to have the rating.

**T**HE Universal Aviation Corporation has retained Dr. Wade Hampton Miller of Kansas City as flight surgeon for its commercial air lines. Dr. Miller will have charge of the company's entire personnel and will examine the pilots and mechanics of its planes every 30 days.

## KANSAS

**M.** E. CALLANDER, formerly assistant manager of the aviation department of the Standard Oil Company of Indiana, is now general sales manager Central Airlines, a division of the Universal Aviation Corporation. Central Airlines distribute Travel Air planes in Oklahoma.

**A** GROUP of ten Wichita women have formed the Wichita Flying Women's Club to take ground and flying instruction at the Braley School of Flying. Flight training of the group is given by Lieut. O. P. Harrah, operations manager of the school.

#### Yellow Air-Cab Company

**T**HE Yellow Air-Cab Company of Wichita, Kansas, is planning to establish an air taxi service in all the larger cities of the country, according to a recent report from Gary E. Prebenson, president of the Yellow Air-Cab concern. Yellow Cab franchise holders will operate the new systems in much the same manner as ground taxi-cab services are operated. The Yellow Air-Cab Company has secured the services of Paul R. Riley, former sales executive of the Swallow Aircraft Company, who will assume the duties of advertising, sales, and organization director for the company's activities.

## SOUTH DAKOTA

**T**HE Black Hills College of Aviation at Rapid City, S. D., has retained Attorney George Philip to give one-hour lectures on the law as it pertains to the operation and ownership of aircraft.

A new set of block testing stands have been erected at Halley Field to assist the Rapid Air Lines' mechanics in speeding up the service now being rendered at their shops at Rapid City, S. D. They are set in cement and fenced away from the public by woven wire fence.

**T**HE Halley Aviation Management, Inc., Rapid City, S. Dak., is a distributor for airplanes and aeronautical supplies in North Dakota, South Dakota, Wyoming, Nebraska and Iowa, having four sales branches throughout the district. The supervision and management will be conducted from the offices in Rapid City, where all sales and advertising will be directed for the different branches. A standard accounting system will be installed in each of the branches, and the standardized Halley system of student instruction will be incorporated at each of the airports. Arthur W. Spence, formerly with the Ford Motor Company, at Detroit, is the general manager of the concern.

(Continued on next page)

See the

# SCINTILLA

AIRCRAFT

MAGNETOS

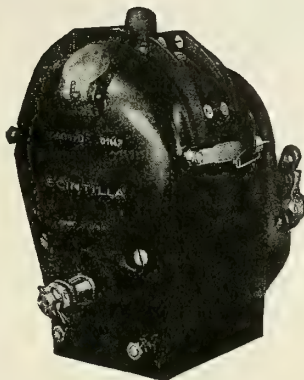
**Scintilla Aircraft  
Magnetos are  
standard with  
Army and Navy**

*They are selected because  
of their*

DEPENDABILITY  
SIMPLICITY  
ACCESSIBILITY

*Scintilla Aircraft Magnetos  
are standard equipment on  
Aircraft engines built by*

Aeromarine Corporation  
Alliance Aircraft Corp.  
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(South Dakota News continued)

**CITY** Officials of Lead, Deadwood and Spearfish, S. D., are planning to establish an airport in Centennial Valley near the Black Hills. The location will serve these and other towns in the neighborhood.

#### Sioux Falls, South Dakota, Airfair

**T**HE Sioux Falls Airfair to be held September 16-21 at the Sioux Falls, S. Dak., airport will award over \$5,500 in prizes to winners of 14 contests. The events to be staged besides passenger flights, maneuvers, parachute jumps, and stunt flying, include a Sioux Falls Airfair derby, all South Dakota race, dead stick landing contests, two balloon busting contests, 21-mile speed race, spot landing, 21-mile pinnacle race, two 28-mile speed races, 28-mile aerial transfer race, 14-mile shackle race, bombing contest, and a 14-mile relay race.

## NEBRASKA

[JAMES R. LOWELL]

**EDWARD A. STALKER**, University of Michigan aeronautical engineer, will be located permanently at the Arrow Aircraft and Motors corporation factory at Lincoln, Nebraska, late this summer. Mr. Stalker designed the present Arrow Sport.

**T**WO runways 2,000 feet long and 135 feet wide at the Lincoln municipal airport have been completed at a cost of \$15,000. A total of more than 60,000 square yards of surface was constructed at a cost of 25 cents a square yard. The field is now fully equipped, with the exception of the hangar which will be 180 feet by 80 feet. Including lighting and the cost of the ground, the field will have cost \$100,000 when completed.

**T**O further safeguard air traffic through the midwest, a supplemental twenty-four hour service has been inaugurated by the Omaha government weather bureau. The service is now operative at Fort Crook airport, where reports are received every three hours from other bureaus in midwestern cities. Omaha is one of the three key cities on the transcontinental air route, Cleveland and Salt Lake City being the others.

**A**RTICLES of incorporation have been filed with the Secretary of State by the Gottberg Aviation corporation of Columbus, Nebraska. The company has declared a \$100,000 capital stock. Those who formed the company are Max Gottberg, John Gottberg, Oscar Gottberg, Max F. Gottberg and Grover Long.

**DONALD M. HALLEY** formerly associate professor of banking and finance at Tulane University, New Orleans, has arrived at Omaha from Rapid City, S. D., to become general manager of Rapid Aviation, Inc., of which Walter Halley is president. The company has been incorporated with the Nebraska Secretary of State for \$100,000 and has leased a 160-acre field for an airport at Omaha. Paul D. Selby of Rapid

City is sales manager, and Eugene Schacher is airport manager at Omaha.

**P**LANS are being made by the commercial club of York, Nebraska, for the dedication of the new airport at York, September 12 and 13 in conjunction with a fall festival and Nebraska's first air tour.

**T**HE Chamber of Commerce at Alliance has secured a four-year lease on 160 acres two miles south of Alliance, Nebraska, the new field to replace the present port which is considered too rough. A large hangar will be constructed at the port.

The American Legion will dedicate the new airport at McCook, Nebraska, on September 13 and 14 in conjunction with the Nebraska air tour. It has started work on a hangar on the airport which will house four planes. The chamber of commerce has underwritten the project to the extent of \$3,000. The hangar will be completed in time for the Nebraska air tour, September 8 to 14.

H. D. Strunk, publisher of the *McCook Daily Gazette*, is sponsoring an air show for the same event. He will also organize an aviation school in McCook. He recently purchased a cabin plane which will be used for delivery of the *Gazette* on a 300-mile route in nine counties in southwestern Nebraska.

#### Nebraska Aviation Legislation

**A**LL pilots of airplanes, with the exception of those operating military or mail planes, will be required to show their licenses on demand, according to a law passed by the Nebraska legislature which went into effect July 25. The law adopts the federal air commerce regulations in their entirety. This was done in an effort to help the uniform establishment of air regulation throughout the nation. Licenses for civil aircraft operation may be procured from the state railway commission.

All peace officers, airport managers and employees are authorized to enforce the law. Their duties will be the inspection of pilots' licenses, and apprehending violators. Copies of the regulations must be displayed in all hangars and air navigation offices, and must be available to the public. Unlicensed pilots are prohibited from carrying passengers. Pilots must carry their licenses with them whenever operating a plane and must produce them upon the demand of a passenger. The operation of out-of-state planes will be governed by the federal interstate regulations.

**A**T a meeting of 85 Lincoln business men and aviation enthusiasts, a Lincoln chapter of the National Aeronautic association was formally organized, with Max Kier elected as president. Other officers of the new organization are Harry B. Sidles, vice-president; Trev Gillaspie, vice-president, and Don Bell, secretary-treasurer. Directors are M. E. Morrison, James A. Haviland, John Aldrich, Victor Roos and D. L. Erickson. Eighty-two Lincoln men have sent in applications for membership.

**T**HE Robertson Company, a division of the Universal Aviation Corporation, operating between Omaha and St. Louis, will do away with its operating force at the Omaha end of the line and give the servicing contract to a local company, according to R. J. Rentz, superintendent of operations. Negotiations have been opened with the Midwest Aviation Corporation of Omaha.

**N**EBRASKA'S first air tour is to be held the week beginning September 8. The Skelly Oil company has offered to furnish gasoline and oil for all ships in the tour, of which there will be about 40 entered. Many of the planes will bear the names of the cities from where they are entered. The tour management will sponsor no races or contests. Whatever events there are of this kind will be left to the individual cities, and must meet with the approval of the tour management as regards safety. Many cities are planning air shows and airport dedications in conjunction with the tour.

Cities which have invited the tour are Fremont, York, Alliance, Chadron, Norfolk, McCook, Columbus, Grand Island, Lincoln, Kearney, Broken Bow, North Platte, Culbertson, Hooldrege, Hastings, Beatrice, Scottsbluff, Tecumseh, Friend, Falls City, Auburn and Nebraska City,—all of which have improved airports. The tour is being sponsored by the Omaha chamber of commerce.

Seventh corps area headquarters at Omaha have announced that it may be possible to include a flight of army planes in the tour. These planes, according to Major H. J. Houghland, air officer, would be allowed to land only on airports which have received a department of commerce rating of DX3 or better.

**M**IDLAND COLLEGE at Fremont will include a course in aeronautics in its 1929-30 curriculum. The course will be presented in cooperation with the Nebraska Flying Service, Inc., of Fremont, and will be patterned after those at Princeton and Leland Stanford Universities. Actual flying instruction will be given by army-trained pilots of the Nebraska Flying service.

**T**HE Arrow Aircraft and Motors Corporation of Lincoln, Nebraska, has secured the services of three men to act as district sales managers for Arrow planes in widely distributed territories, and to aid on resales and service problems of the respective territories. Harry I. Day at Roosevelt Field, N. Y., will have the territory including West Virginia, Virginia, Pennsylvania, New York, New Jersey, Maryland, and the New England states. Roy Morris will have the south midwest territory including Kansas, Missouri, Oklahoma, New Mexico, Arkansas, Louisiana and Texas. Joe Lewis at Clover Field, Santa Monica, Calif., has the Pacific Coast territory. The Acoste Aircraft corporation of New Jersey has closed a contract with Arrow as distributor for the plane in Pennsylvania and New Jersey.

Layout and drawings have been completed

(Continued on next page)

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Beautiful new building—pictured to the right—will shortly be completed. It will house the various activities of the great National Air Industries, including Consolidated Air College. Think of getting your training in this remarkably modern building situated right on famous Fairfax Airport.



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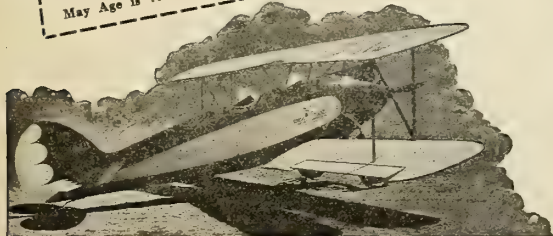
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# CONSOLIDATED AIR COLLEGE Inc.

Kansas City, Missouri



(Nebraska News continued)

for an Arrow speed plane designed to make 166 miles an hour. The job will be a land type biplane and much larger than the present Arrow Sport. In the On-To-Des Moines, Ia., race staged recently in conjunction with the Des Moines air show, an Arrow standard LeBlond 60 powered biplane placed fifth against 33 other planes.

THE work of placing guiding towers, beacons and intermediate landing fields on the Boeing route between Omaha and Lexington has been put in operation on the Omaha-St. Joseph, Mo., section of the Omaha-Kansas City route of the Universal lines, and the remainder are ready for service.

THE Nebraska Flying Service Company at Fremont is asking permission from the state to issue stock amounting to \$100,000 to finance an airport at Fremont. Officers of the company include Lloyd W. Phillips, president; Dale Milliken, George Wolz and State Representative George Staats. The company has already obtained leases on lands adjoining the city, and proposes to start construction with an authorized capital stock of \$250,000.

TOMMIE SCOTT has been appointed manager of field operations of the Pioneer Airways aviation school at Omaha, succeeding Charles Kenwood who resigned as superintendent to become a Boeing pilot.

AN air travel service has been established by the Omaha Auto club to give detailed information on flying schedules and passenger reservations. The club is also operating service cars to assist member-pilots who have made forced landings, towing the plane to the field and giving similar service. Arrangements have been made with the Universal and Rapid Air Lines, and negotiations are underway with Boeing officials, for the augmented service.

RAPID AVIATION, INC., of Omaha has finished one 44 by 30 foot hangar and is starting another one of the same size at the Council Bluffs, Ia., airport. The corporation has a five-year lease on the port.

THE Wright Gipsy engine is to be fitted with standard equipment including two Scintilla magnetos, Stromberg carburetor, mounting arms, tool kit, ignition switch, exhaust manifold, and engine cowlings, according to a recent report of the officers of the Wright Aeronautical Corporation. The Gipsy engine is produced in the St. Louis plant of the concern.

THE Boeing System has established an office in Omaha with H. W. Peterson, traffic representative, in charge. The office will serve as headquarters for the territory including Lincoln, Nebr., Des Moines, Iowa City, and Cedar Rapids, Ia. It will sell tickets and provide general information.

## MINNESOTA

[LYLE F. YOUNGSTROM]

THE Twin Cities-Chicago night air mail service was inaugurated recently by Northwest Airways. Northwest Airways bought three new Waco planes, powered with 300 horsepower Wright Whirlwind Nine engines, capable of developing 162 miles per hour, for the night air mail service.

Passenger travel on the Northwest Airways has increased to such an extent that service has been doubled on the route on Thursdays, Fridays and Saturdays. Two extra seven-passenger planes have been added on the Chicago-Twin Cities week-end schedule. Two planes now leave the terminal at 3:05 p. m., carrying both air mail and passengers, and arrive in Chicago at 7:25 p. m. On the westbound route, two planes leave Chicago at 3 p. m., and arrive in the Twin Cities at 6:40 p. m.

WINONA'S airport, the Conrad-Templeton field, which is three miles west of the city, was dedicated August 5, with city and state officials and members of the state American Legion participating in the ceremonies. Among those who took part were Governor Theodore Christianson, Congressman Victor Christgau, John A. Johnson and State Senator Lloyd E. Lillygren.

Eight planes from Selfridge field, three from the 109th Aero Squadron at Wold-

(Continued on next page)

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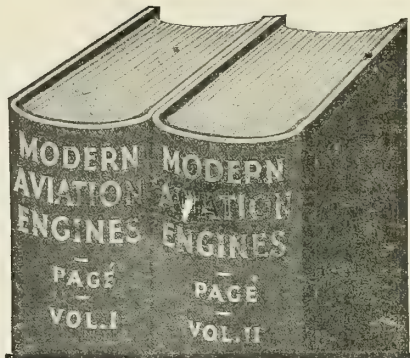
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A. D. 9-29



(Minnesota News continued)

Chamberlain field, and three planes of the Conrad-Templeton Aircraft Company of Winona, were among the visiting planes. The new airport, which is adjacent to the government field, is approximately 1,800 by 2,500 feet in size, and has three runways in good condition.

#### Minnesota Towns Erect Air Markers

SEVENTY-FOUR cities and towns in Minnesota have responded to the request of the Guggenheim Fund for the Promotion of Aeronautics that they identify themselves for fliers. Towns which have answered the appeal include Aitkin, Anoka, Argyle, Barnesville, Belle Plaine, Bemidji, Benson, Bird Island, Biwabik, Blue Earth, Bovey, Caledonia, Coleraine, Crookston, Crosby, Detroit Lakes, Dodge Center, Elbow Lake, Elk River, Eveleth, Fairmont, Farmington, Fergus Falls, Fertile, Gaylord, Glenwood, Hallock, Hastings, Hector, Heron Lake, Hibbing, Hutchinson, Himesville, Lake City, Lake Crystal, Le Sueur, Le Sueur Center, Little Falls, Luverne, Madison, Mankato, Mapleton, Marshall, Melrose, Montevideo, More, Morris, Olivia, Ortonville, Osakis, Owatonna, Perham, Pipestone, Rochester, Roseau, Rush City, Rushford, Saint Charles, Sherburn, Slayton, Springfield, Spring Valley, Staples, Thief River Falls, Tracy, Virginia, Wadena, Warroad, Waseca, Waterville, Willmar, Winona, Winthrop and Worthington.

CANADIAN American Airways, Inc., recently began operations on its new line between the Twin Cities and Winnipeg, Canada. The distance is approximately 500 miles. Planes leave the St. Paul and Winnipeg airports at 1 p. m. daily and arrive at their destination at 5:20 p. m. Schedules have been arranged to offer connections with trains in St. Paul so as to make possible trips between Winnipeg and New Orleans in two days less time than by rail. The schedule is: Leave Winnipeg at 1 p. m. by Canadian-American Airways and arrive in St. Paul at 5:20 p. m. Leave St. Paul by train at 7:00 p. m. and arrive in Chicago at 6:55 a. m. next morning. Leave Chicago at 8:45 a. m. on Continental Air Service planes, arriving in St. Louis at noon, and at New Orleans at 7:40 p. m.

THE Travel Air agency franchises for Minnesota has been awarded to the Mid-West Aviation Corporation, Travel Air distributor in Nebraska.

THE Smith Welding Equipment Corporation of Minneapolis has recently completed the installation of piping and equipment which will be used in the airplane welding course that will be given at Porterfield Flying School in Kansas City.

This course in aeroplane welding which will be given at the Porterfield School is the same course as is given by the Universal Aviation Schools at Minneapolis and St. Louis.

#### DULUTH

[ARTHUR G. PATTERSON]

AS part of a three day civic program held in Duluth, formal breaking of ground at the Harvey F. Williamson municipal airport took place on August 8. The field is being constructed by the city of Duluth. The event was attended by city officials of Duluth and Minneapolis. Mayor S. F. Snively of Duluth, assisted by Mayor William F. Kunze of Minneapolis, took a leading part in the program.

Application has been made to make Duluth a port of entry for airplanes between United States and foreign countries. Upon completion of the Harvey F. Williamson municipal airport in November, and establishment of air service between Duluth and foreign countries, it is expected that Duluth will be designated as a port of entry. In the meantime pilots of all airplanes desiring to land in Duluth from foreign countries must first obtain permission from the commissioner of customs and agree to pay the expense of inspecting the ships.

THE Duluth Club, the Sky Climbers of America, which is sponsored by the Columbia Clothing Company of Duluth, held its first annual picnic at Chester Park in Duluth. The organization, which was founded to encourage and promote boys' interest in aviation, has a membership of 900 boys in Duluth from 7 to 14 years of age. The members of the club have the use every morning of clubrooms located in the Columbia building, which were provided by the Duluth sponsors of the club.

## WISCONSIN

[WILLIAM SCOLLARD]

AIR SHARES, INC., is a new Milwaukee firm formed to act as an investment trust to hold marketable securities of aviation concerns. Clyde Hudspeth is president of the firm, Hans Herzfeld vice-president and John Leekley secretary-treasurer. The board of directors includes Elling O. Weeks, Fred Pabst, Jr., and Kenneth Grubb, in addition to the officers.

THOMAS L. EDWARDS has been named superintendent of the aircraft exhibit at the Wisconsin State Fair, August 26 to 31. Mr. Edwards succeeds Elling O. Weeks, who managed the display last year.

RIGHTS to use Hamilton plane plans to make ships in Italy on a royalty basis were sold recently to the Trans-Asiatica Company, Rome, Italy, according to a recent announcement by Charles F. Barndt, manager of the Hamilton Metalplane Company, Milwaukee. The Italian company now uses a Hamilton plane in passenger service over the Alps.

MANAGEMENT of the Milwaukee county airport, which has been under supervision of the Milwaukee County Park Commission, was recently turned over to the highway committee of the county board. The change was authorized by recent state legislation.

A TWO-DAY celebration marked the opening of the new Ashland city airport at Ashland. Mayor M. E. Dillon and Howard Bretting, president of the Ashland Aeronautical Association, spoke at the dedication. The 100-acre field, purchased by the city about a year ago, now has a complete runway 3,000 feet in length and 100 feet wide.

A MEASURE which enacts into the Wisconsin state laws nearly all of the federal air laws has been signed by Governor Walter Kohler. The new state aviation code empowers towns, cities, villages and counties to acquire sites for airports and construct hangars and other equipment. Municipal

(Continued on next page)



The Verville Air Coach which is being produced by the Verville Aircraft Company, Detroit

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KINNER AIRPLANE & MOTOR  
CORP.  
LAMBERT AIRCRAFT CO.  
(Formerly Velie Motor Corp.)  
LE BLOND AIRCRAFT ENGINE  
CO.  
LYCOMING MOTOR  
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Minneapolis, Minn.

Kansas City, Mo.

London, England



(*Wisconsin News continued*)

rules for the safe operation of planes are also legalized by the measure.

It prohibits stunt or acrobatic flying over thickly inhabited areas, or over crowds at public meetings, and makes every owner of aircraft liable for damages to property caused by the flight of a craft, or the dropping of any object therefrom, unless the injury was caused by the negligence of the person injured. Every person operating an airplane or aircraft must possess a pilot's license issued by the Federal Department of Commerce, and every person adjusting or repairing aircraft must have a federal mechanic's license.

**NORTHERN AIRWAYS, INC.**, of Wausau, Wis., recently purchased all assets except planes of the Hall Aircraft Corporation. The firm has also secured a lease on the Oshkosh Airport which will be used as a sales and service base and for another flying school. Mark Hubbard will act as sales and service representative and manager of the Alexander Airport at Wausau. Charles Gilly will operate the Oshkosh field.

Already serving as distributors of Waco and Stinson planes, Hamilton propellers, Pioneer instruments and other supplies, Northern Airways, Inc., has also acquired the distributorship of Berryloid finishes. Complete equipment for refinishing airplanes is maintained in Wausau.

**CLARENCE FALK** was elected president of the recognized Milwaukee chapter of the National Aeronautic Association at a recent meeting of that organization. Twenty-six men joined the chapter. Other officers are: John M. H. Nichols, first vice-president; Daniel Kiser, second vice-president; Col. Peter F. Piasecki, third vice-president; Carl B. Schory, secretary and treasurer.

**PLANS** for the extensive development of the Milwaukee county airport have been announced by J. C. Dretzka. The contract for the new \$7,400 service hangar has been let. The hangar will house the fire apparatus, gas pumps, a repair shop and the electrical controls.

**THE** Waukesha Motor Company, Waukesha, has taken an option on a tract of land near the city to develop it as a testing field for airplanes. The company for sometime has been working on a Diesel type motor for airplane use. It will have about 350 horsepower, and will be suitable for use in either single or multi-motored planes for mail and passenger service.

**APPOINTMENT** of John H. Geiss as vice president in charge of engineering for Comet Engine Corporation at Madison, Wisconsin, was recently announced by Harvey L. Williams, president of the company. Mr. Geisse, formerly experimental engineer for the Army and the Navy, is in charge of engineering.

Comet's new plant is located near the Gisholt Machine Company buildings at Madison. Thirty thousand feet of floor space are occupied by new machine tools, parts racks, designing rooms, and offices. A Comet engine runs continuously every day on the test stand, at cruising speed or wide open, in the new plant.

**THE** Esline Company of Oconomowoc, Wisc., manufacturer of all-steel hangars, was recently granted permission to use air mail reply cards by W. Irving Glover, Second Assistant Postmaster General. The Esline firm has sent out 10,000 of the cards with folders describing its products. Six cents postage is paid for each card returned.

**THE** Nepco Tri-City Flying Service, Inc., Wisconsin Rapids, has recently been appointed dealer for Fairchild and Fairchild KR airplanes. The company's territory covers the State of Wisconsin.

**MARQUETTE** University, at Milwaukee, will offer courses in aeronautical engineering as a part of the college of engineering next fall, according to a recent announcement of Franz A. Kartak, dean of the college. The university will not offer flying courses.

Courses to be offered will include elements of aviation, aero-dynamics, design of screw propellers, aircraft power plants, elementary airplane design, airplane design and history of aeronautics.



No. 50—Chocolate Brown Helmet, Glove Leather, Chamois Lined, with ear pads.....\$6.00  
No. 556—Same as above except white or khaki canvas.....\$2.00  
Also regulation Army and Navy Helmets.....\$6.00

Be sure to send money order with head size. Helmet will be sent parcel post prepaid. Mondl helmets patented in U. S., England and Canada.

During those flights that test the stamina of flyer and plane alike, those grueling tests of endurance against the elements, where every precaution must be taken, you will find aviators using Mondl Helmets.

With a wide chin strap, hugging the cheeks; designed to fit the head closely; Mondl Helmets are wind-proof. They are made of fine quality glove leather, chamois lined and equipped with ear pads to deaden the unceasing roar of the motor.

Mondl Helmets are comfortable and meet the exact needs of the flyer.



**FOR JOBBERS' ATTENTION**

Mondl Helmets have proven themselves good sellers. Write for a sample helmet and our attractive proposition.



## Famous Flyers use Mondl Helmets

**Mondl Mfg. Co., Oshkosh, Wisconsin, U. S. A.**

Manufacturers of Aviation Helmets and Sheepskin Footwear

# 90% PLUS

USED AND ENDORSED  
BY THE MAKERS OF  
OVER NINETY PER  
CENT OF AMERICAN  
AVIATION ENGINES!



**T**HE above include Aeromarine, American Cirrus, Bliss, Comet, Curtiss, Fairchild, Pratt & Whitney, Warner, Wright and others.

One transport operator alone, using 44 Pratt & Whitney Hornet Engines equipped with U. S. Special Aviation Piston Rings, reports 16,757 hours and 1,709,200 miles of total operation to date, an average of 380 3/4 hours and 38,836 miles per engine. Six of these engines alone have flown an average of 876 hours and 89,352 miles.

Wright "Whirlwind" Engines have been equipped with U. S. Special Aviation Piston Rings for their many spectacular flights during the past three years, including that of Colonel Lindbergh from San Diego to New York and from New York to Paris in 1927, various trans-Atlantic and other record flights made since, and that of Mendell and Reinhart recently who flew the "Angeleno" 246 hours, 43 minutes and 32 seconds.

What we have done in solving piston ring problems for these motors we can also do for others. We have been supplying Special Aviation Piston Rings since 1917. "If It's a Piston Ring, We Can Make it."

**U. S. HAMMERED PISTON RING CO., PATERSON, N. J.**

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**RINGS**



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Say you saw it in AERO DIGEST



# 5 YEARS



Colonial is identified with the earliest operation of the Air Mail, as Contract Air Mail Route 1, New York, Hartford, Boston—Foreign Air Mail Route 1, New York, Albany, Montreal—Contract Air Mail Route 20, Albany, Rochester, Buffalo, Cleveland—are all operated by Colonial Companies • Passenger Transport Lines, on regular schedules between New York City and Boston, New York and Montreal, and from Buffalo to Toronto are also a part of the Colonial System • Colonial Flying Schools are maintained in New York State and New England • From this well-rounded experience Colonial has selected the planes for which agencies are being offered.

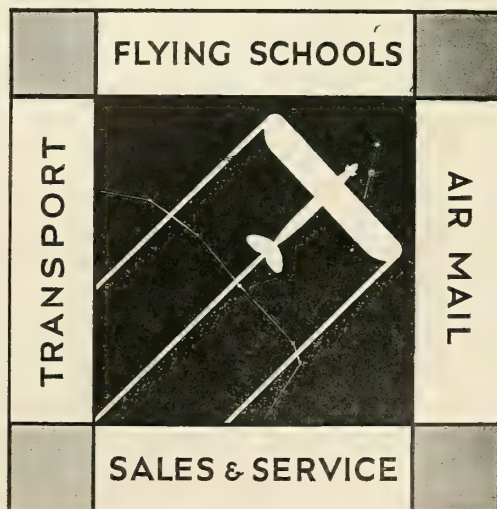
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FOR OPPORTUNITIES SUCH AS THIS.**

To a limited number of men of standing, possessing a reasonable amount of capital, Colonial Flying Service offers agencies in New York State and New England for the following planes:—  
**Fleet**, Fairchild, Challenger, Pitcairn, and Standard..  
**FLEET**—Model 1. Price \$5,485 F.A.F.  
 —Model 2. Price \$4,985. F.A.F. A recent commercial development of the Consolidated Training Plane used by the Army, Navy and Marine Corps. A splendid student instruction ship with dual control—powered with a Warner "Scarab" 110 H. P. or a Kinner 100 H. P. motor .  
**CHALLENGER**—Model KR 21A. Price \$4,685 F.A.F. A tapered wing two place plane for the private owner who wants a small, fast sport ship. Dual control—very maneuverable—powered with a Kinner 100 H.P. motor .  
**CHALLENGER**—Model KR 34A. Price \$6,575 F.A.F. An ideal three place open plane with dual control, suitable for cross country flying. Powered with a Wright J6-165 H.P. motor. Plenty of speed—brakes for ground control—economical to operate .  
**PITCAIRN**—Sport Mailwing. Price \$8,500 F.A.F. The last word in design refinement and sturdy construction. Especially built for Air Mail operation. A three place, open plane with dual control—powered with a Wright J5-225 H.P. motor. Very fast, 145 M.P.H. with N.A.C.A. cowling—brakes for ground control .  
**FAIRCHILD**—Model 71. Price \$18,900 F.A.F. A cabin plane accommodating a pilot and six passengers. Ideal for charter operation and for business concerns requiring air transportation. Powered with a Pratt & Whitney Wasp 425 H.P. motor .  
**STANDARD**—Model D-25. Price \$9,750. A five place open plane—designed for passenger hopping from all types of fields—exceptionally high load capacity—quick take-off and low landing speed. Removable dual control—powered with a Wright J5-225 H.P. motor—brakes for ground control .  
 The market for the sale of planes divides itself into: 1. Training schools and student flyers, 2. Business organizations for commercial use, 3. Private owners for sport and personal transportation, and 4. Operators for charter service and passenger hopping. The range of planes for which Colonial offers franchises is varied as to price and type so as to meet all demands of the market . Colonial franchises cover the sale of ships and all equipment pertaining to their operation and maintenance. Affiliation with established flying fields can be arranged . A Colonial franchise offers an immediate opportunity for a small volume, profitable business. If you are interested in this business of aviation, write for territories available and conditions for securing a franchise.

## COLONIAL FLYING SERVICE, INC.

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## ILLINOIS

THE Avigo Flying Club of Elgin, Illinois, was formed recently by employees of the Elgin National Watch Company and residents of Elgin. The club chose for its name the trade name of the aircraft instrument division of the Elgin National Watch Company, and the aircraft instrument division has furnished the members with suits, helmets and goggles, as well as equipping the Swallow training plane of the group.

### Monoprep Receives Approved Type Certificate

THE Department of Commerce has issued an approved Type Certificate for the Monoprep training plane produced by the Mono-Aircraft Corporation of Moline, Ill. The company has recently added a new model, the Monosport, to its line of airplanes. There are now four models, the Monocoach, 4-place cabin; the Monosport, 2-place cabin; the Monoprep, 2-place open, and the Monocoupe, 2-place cabin.

CONVEYING equipment, hoisting apparatus, slings, and door equipment are among the products suitable for airplane hangars in Catalogue Number 50 recently issued by the Richards-Wilcox Manufacturing Company of Aurora, Ill. This concern manufactures a complete line of hoisting and overhead conveying equipment.

The Richards-Wilcox firm is the producer of the Over-Way products, and has been in the business for forty years. It has perhaps the largest manufacturing plant of its kind in the world. The officers of the company include W. H. Fitch, president and general manager; Lee Mighell, vice president; Milton D. Jones, secretary and treasurer; and P. L. Hoffman, superintendent.

VOTERS of Moline, Ill., recently passed an ordinance authorizing the collection of a mill tax to establish and maintain an airport. The Curtiss Flying Service field there will be purchased and supported by the tax, which will allow the expenditure of about \$50,000 annually.

## CHICAGO

THE United Aviation Corporation of Chicago recently sold the Gray Goose Airlines, Inc., and the North Shore Airport Company to the Chicago Air Service, Inc. The Chicago Air Service organization has been financed by a group of Chicago bankers to operate various aviation activities in and near Chicago.

Gray Goose Airlines, Inc., has been operating for nearly two years at the Chicago Municipal Airport, where it owns two hangars, from which it conducts a sight seeing, taxi, and school business. The North Shore Airport Company recently completed its airport near Glencoe, Illinois, north of Chicago. The airport is completely equipped with modern runways, boundary lights, flood lights, and other facilities for operation. A hangar 100 by 120 feet in size has just been completed. The administration

building combines the offices of the company with sales rooms for flying equipment, instruction and locker rooms for pupils, and restaurant facilities. The upper floor and tower have been rented to the Petruska Club. The North Shore Airport Company is also engaged in sight seeing, taxi and training activities.

THE Shaffer Oil and Refining Company of Chicago, Ill., recently announced a prize contest for a trade name to identify its aviation gasoline and lubricating oils. Only licensed aviation pilots, mechanics, and students are eligible to compete. The contest closes October 15th.

THE Bloxham Aero Supply Company of Chicago has appointed the Pellet Magneto Co., of Chicago, the Logan Aviation Co., of Cleveland, and the Western Aviation Co., of Oakland, Calif., as distributors for Bloxham Safety Sticks. The Command-Aire, Inc., of Little Rock, Ark., has adopted the Bloxham Safety Stick as standard equipment. The Bloxham firm has announced the Voice Phone for training communication between instructor and pupil.

ARRANGEMENTS have been concluded between the Pyle-National Company of Chicago and the Super Service Corporation and the Research Club, Inc., for the distribution of Pyle-National airport and aircraft lighting equipment by the latter two organizations. Members of the two organizations include many automotive equipment jobbers throughout the country. Both organizations are wholesalers in the automotive industry.

Aircraft lighting equipment manufactured by the Pyle-National Company includes landing lights of several designs, aviation lights, and special switches for the control of these lights.

JIM LA MONT, who is chief mechanic for Northwest Airways, has been actively engaged in aviation since 1908. He assisted in the building of the *June Bug*, Curtiss' first pusher biplane powered with a 35 horsepower motor, and later helped rebuild the Langley plane. He built Ruth Law's plane and toured the country with her as her mechanic for six years. Mr. La Mont now has complete charge of the Ford transports flown by Northwest Airways.

THE Fusion Welding Corporation, a subsidiary of the Chicago Steel and Wire Company, has taken over the sale of all welding rods manufactured by the parent company. The change provides one source of supply for both Weldite Welding Rods and Fuzon Welding Equipment and accessories previously sold by the two companies.

CIVIC organizations of Chicago have launched a campaign urging the City Council to make an appropriation of \$450,000 to insure Chicago a greater position in air transport circles. Chicago's airport is now located on 120 acres of ground, of which only a part is available area for planes. A tract of 160 acres lies to the west

of the airport and is also included in the lease held by the city; but lack of funds has made it impossible to develop this section.

THE Bendix Aviation Corporation officially reported net earnings for the six months ended June 30, 1929, of \$5,165,967.82. These earnings do not include those of the Pioneer Instrument Company, which was acquired in the latter part of June. In making the statement public, Vincent Bendix, president, said that several of the units comprising the corporation will become more active in production in the last six months of the year than in the first six months.

THE RAND-McNALLY Company has announced the publication of a new airways map of the United States measuring 42 by 28 inches on a scale of 80 miles to the inch, printed in six colors, showing state and international boundaries, the principal cities, rivers and lakes, and the mountains. Established air routes and lines of equal magnetic variation are shown in red. Mileage distance circles are drawn at 200-mile intervals around the point at which the map is to be used.

The map is drawn on a conic projection based on two standard parallels, which makes it possible to measure air-line distances and directions directly from the map with practical accuracy. The map is available in several mountings including cloth and board for use as a wall map, and may be obtained in sheet form for use on a desk or table under glass.

LEONARD MACOMBER, INC., airport engineering company of Chicago, recently completed preliminary surveys, and selected sites for municipal airports at Muncie, Ind., and Sioux Falls, N. D. Recommendations for a class A1A Airport at Muncie will be submitted to the city council for final action.

THE Bendix Aviation Corporation of Chicago, Illinois, recently announced the incorporation of the Eclipse Aviation Corporation as a subsidiary unit of the Bendix concern. The Eclipse Aviation Corporation was formerly the Aviation plant at East Orange, N. J., of the Eclipse Machine Company. Standard equipment, together with other aeronautic service devices by the East Orange plant, will be produced.

THE Cole and Sons Motor Company of Carbondale, Ill., is distributor of the Davis V-3 Monoplane in southern Illinois and western Kentucky. Dayton Air Institute Inc., of Dayton, Ohio, is distributor of the Davis V-3 Monoplane in central and western Ohio.

THE Warner C. Miller Realty Company of Chicago has found that prospects who view its property from the air are sufficiently interested to sign on the dotted line when the plane lands. Regular trips are being made now by salesman with prospects, using planes of the Universal Air Lines.

# Worthington Airport Field Equipment

**W**ORTHINGTON tractors, mowers and rollers will effectively care for your flying field. Selected by United States War Department for Army and Navy Airports.

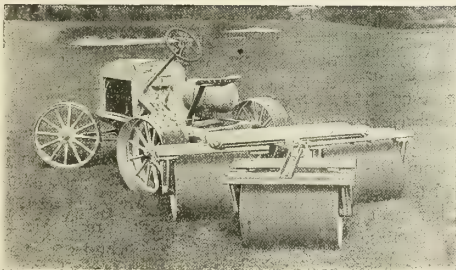


**O**PERATING successfully at Agawam Airport, Langley Field, Bolling Field, Wright Field, Middletown Air Depot, Wichita Municipal Airport, Wheeler Field, Honolulu.

Illustrating the fastest and most economical tractor and gang mower in the world. Cutting swath nearly 12 feet.

## Worthington Mower Units

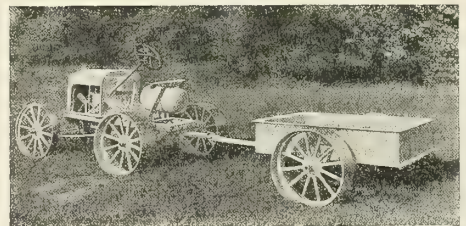
are fitted with novel patented devices for cutting the heavy grass at exactly the right height on rough and stony fields, thus making them adaptable to all landing field requirements and conditions



Worthington Gang Roller. Weight 900 pounds empty, 1750 pounds sand filled. Flanged steel rollers.



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Worthington Lawn Tractor and Dump Cart. The cart is of steel throughout.

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AGENCIES IN ALL PRINCIPAL CITIES



## INDIANA

[R. B. NUSSBAUM]

A FLIGHT contest for Indiana fliers, up to and including the private license class, will be conducted at the Curtiss-Mars Hill airport at Indianapolis, August 31, under the direction of Charles E. Cox, Jr., assistant general manager of Curtiss Flying Service of Indiana.

The contest will be similar to flight examinations given by Department of Commerce inspectors for private licenses. Three prizes will be awarded, and winners will be given a 500-mile airplane tour of the state by the Curtiss company. On the trip they will be given instruction in map reading, general navigation and course finding.

THE Hoosier State Automobile Association has completed the second of a series of air tours through Indiana. The trip was made in two planes of the Embry-Riddle Company of Cincinnati. The tour was made for the purpose of obtaining accurate information about Indiana's aviation fields. Cities visited included Indianapolis, Seymour, Bloomington, Bedford, French Lick, Princeton, Evansville and Vincennes.

ARTICLES of incorporation have been filed by the Corman Aircraft Corporation of Connersville, Ind. Incorporators are E. L. Cord, L. E. Manning and Raymond S. Pruitt. The city council of Connersville is planning a \$50,000 bond issue to establish a municipal airport.

SUPERIOR JUDGE BYRON K. ELIOTT, of Indianapolis, is the new president of Curtiss Flying Service of Indiana, Inc., succeeding the late James A. Perry. Other officers are: H. Weir Cook, first vice president and general manager; C. S. (Casey) Jones, second vice president; Paul Q. Richey, secretary, and J. A. B. Smith, treasurer. Directors of the concern other than officers are Norman A. Perry and G. M. Williams.

A Spanish mission type restaurant building is being completed at the Curtiss-Mars Hill airport, Indianapolis, by the Curtiss Flying Service. The restaurant will seat thirty-two persons. One wing of the building will contain club rooms for the Solo Club of Indianapolis.

THE Terre Haute airport commission will have the municipal airport adequately lighted for night flying before inauguration early in September of night trips on the Interstate Air Lines, Inc., mail route from Chicago to Atlanta. Interstate officials recently announced the stop would be given to Lafayette unless the Terre Haute airport was properly lighted.

THE Paul Baer municipal airport, Fort Wayne, was re-opened August 1, after being closed several weeks by the aviation board to permit draining and grading. The city council recently authorized a \$200,000 bond issue for the work, and for new hangars, garage, and administration building.

WORK is to be started at once on the new 160-acre municipal airport site at Muncie, recently donated to the city by Abbott L. Johnson, aviation commission president. The ground was purchased by Mr. Johnson for \$35,000.

CONSTRUCTION of the new aerological building at the Evansville municipal airport is well under way. Observers already have been appointed for the station by the government. The building is being provided by the city at a cost of \$6,500.

THE Washington Aircraft and Transport Corporation of Seattle, Washington, distributor of Davis V-3 Monoplanes in the Northwest, has received its first carload shipment of V-3 planes. These planes are produced by the Davis Aircraft Corporation of Richmond, Ind.

AN aerial marker 66 feet by 100 feet has been painted on top of the Wolford building in Linton, Indiana. The work was done under the supervision of Roy Roeder, a Linton flier. The letters are 15 feet high, and an arrow points the way to the local flying field two miles distant.

## MICHIGAN

[KARL F. ZEISLER]

CONTROL of Michigan's aviation activities are to be centralized in the hands of the new State Board of Aeronautics, authorized by the recent session of the legislature. Meeting in Lansing for the first time, the board was told by Governor Fred H. Green that the administration favored the establishment of a state airport at that city and the use of other state-owned lands wherever available for the development of landing fields. The board elected William B. Mayo, chief engineer of the Ford Motor Company, chairman, and Claude Carney, vice-chairman. Capt. Eddie Rickenbacker, originally appointed to the board, was forced to resign, owing to his removal from Detroit to New York, and his place has been filled by Capt. William Sparks. Other members of the board are Capt. Ray Collins, Frank L. Betts and Harry Fletcher. The board plans to inspect and license all airports in the state within 60 days after it becomes legally operative on September 1.

### T.A.C. Completes First Year on C.A.M. 27

CONTRACT Air Mail No. 27, covering 17 cities in Michigan, Illinois and Indiana, and the first air mail line to serve an entire state, celebrated its first birthday on July 17. During its first year, the state line carried 154,203 pounds of mail. The line is operated by the Thompson Aeronautical Corporation, which also operates passenger lines from Bay City through Kalamazoo and an amphibian passenger service between Detroit and Cleveland.

The Thompson company started its service with five planes flying 1,042 miles daily; it now flies 21 planes, 2,600 miles daily, 1,022 of which are night flying. It ranks fourth

among the nation's air mail carriers. The greatest cargo of air mail ever flown at one time was handled by this company on August 21, 1928, when 17 Stinson-Detroiters took off from the Lansing airport for Chicago with ten tons of mail for the Reo Motor Company. The company reports 396,356 miles of flying without a major accident.

On its anniversary, the company announced extension of its service to include a night mail and passenger run between Pontiac and Chicago, connecting with Detroit and South Bend, Ind., and an additional line between Pontiac and Cleveland. The company now operates day runs between Bay City and Muskegon and Chicago and night runs between Bay City and Cleveland.

Fourteen additional beacons for night flying are provided for on air mail routes in Michigan by a recent contract awarded by the Department of Commerce, increasing the total number of beacons to 30. Eight new lights are to be placed on the Detroit-Kalamazoo route and six on the Detroit-Bay City route.

A NEW aviation motor industry for Michigan is under way at Marysville, where the old plant of the Wills Ste. Claire Motor Company is being reconditioned for the manufacture of Cirrus engines. Allied Motor Industries, of which the American Cirrus Engines, Inc., is a subsidiary, has announced that the plant will be in operation by January 1, with 500 men employed on the manufacture of a new airplane motor. The Cirrus company reports orders on hand for 2,000 motors, and as its plant at Belleville, N. J., has reached its capacity, work will be rushed on the new Marysville plant. Officials of the Allied Motors Industries recently visited Port Huron and secured the pledge of the chamber of commerce for co-operation in the new enterprise. Mr. William Robert Wilson, president, announced that \$1,000,000 would be spent within a year on the Marysville project.

THE Pontiac Airport was used on July 29 for the take-off of the pathfinding ship for the 1929 National Air Tour for the Edsel B. Ford trophy. Capt. Frank M. Hawks, holder of the transcontinental non-stop flight records, arrived at the field after a trip from New York in four hours 30 minutes, and picked up Capt. Ray Collins, general manager of the tour. Capt. Hawks, who is referee of this year's tour, was flying his record-holding ship, a Lockheed Vega powered with a Pratt & Whitney Wasp. The pathfinders planned to cover the 5,280 miles on the itinerary, which includes 32 cities in Canada, the East, South and Middle West in ten days, and return to Pontiac. Cities visited on the pathfinding trip included: Windsor, Toronto and Ottawa, Ont., Montreal, Portland, Me., Boston, New York, Philadelphia, Baltimore, Richmond, Winston-Salem, N. C., Greenville, S. C., Savannah, Ga., Jacksonville, Fla., Macon, Atlanta, Nashville, Cincinnati, Louisville, St. Louis, Springfield, Ill., Wichita, Kan., St. Joseph, Mo., Des Moines and Cedar Rapids, Ia., St.

(Continued on next page)

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**NO BRITTLE JOINTS**

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AUG. 26th

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(Michigan News continued)

Paul, Wausau, Wis., Milwaukee, Moline, Ill., Chicago, Kalamazoo and Detroit.

**O**WOSO, Mich., dedicated its new 100 acre airport August 3 and 4 with an air meet participated in by 30 planes, including three from Selfridge Field. The port is operated by Robert Wilcox and Charles Willson, and has runways east and west of 2,800 feet and north and south of 2,400 feet, located one-half mile east of the city on a main highway.

**A**N 80-acre field was recently purchased by a group of citizens of Lake Orion, Mich., and is to be developed by a corporation capitalized at \$50,000. Lake Orion has a population of 1,000.

## DETROIT

**T**HE initial long distance trial flight of Continental Motors Corporation's new seven cylinder 160-horsepower radial engine was successfully accomplished recently with W. R. Angell, executive vice president of the company, as passenger. It was mounted on a Stinson Jr. four-passenger cabin plane recently purchased by the company for test works. This test work included 100 hours in the air before any attempt was made to leave the vicinity of Stinson field.

### Detroit to Build All-American Show Hangar

**T**HE Common Council of Detroit, Mich., recently authorized the construction of a million-dollar hangar and exposition building on the Detroit City Airport. The building will be completed in time for the third All-American Aircraft Show in April, 1930. The new building will be a single structure of sufficient size to meet the requirements of the annual event on a single floor.

At the first and second aeronautical exhibitions, many firms were unable to participate because of lack of space. The shows were held in halls far removed from any field, requiring visitors and exhibitors to make rather long trips between the show and places where planes were demonstrated. The new hangar will remove these inconveniences, the distance from the field to the exhibition consisting of only a short walk to the door.

Active preparation has already begun for the All-American show next April. Entry blanks have been mailed and arrangements made to permit the manufacturers to draw for and select the space during the progress of the National Air Races at Cleveland.

Captain L. M. Woolson, chief engineer of the Aircraft Division of the Packard Motor Co., originated the idea of the new hangar and exposition building. Much credit also goes to the men of the Aircraft Bureau of the Detroit Board of Commerce: Edward S. Evans, William B. Mayo, William E. Metzger, W. Magruder Jones, and Eugene W. Lewis who sponsored the project. John W. Reid, commissioner of public works, and Perry Fellows, city engineer, are the architects of the new building.

## FLORIDA

[JOHNSON WRIGHT]

**T**HE Rogers Air Lines, Inc., of Miami, organized in 1920 by Harry Rogers, has been taken over by the New York and Suburban Air Lines. The company maintains its principal base at Miami. During the past four years the Miami base has been operated during the summer seasons. The base is in charge of Robert Moore.

**L.** C. McCARTY, designer of the Miami Maid, a five-place monoplane amphibian produced by the Miami Aircraft Corporation, has been promoted to chief engineer and is also in charge of production of the concern. The plant and force has been increased and production is being rushed.

**C**LEWISTON AIRWAYS, INC., was organized recently at Clewiston by P. G. Bishop and Louis A. Morgan, Jr., for the purpose of operating a flying school at the airport located there. Neil Stewart, pilot of Mr. Bishop's plane is to be manager of the company and instructor.

**F**RED J. SCHWAEMMIE has succeeded George E. Chambliss as operations manager at the Miami terminus of the New York Miami air line operated by Pitcairn Aviation, Inc. Mr. Chambliss has joined the Pitcairn manufacturing interests.

**T**HE City of Miami has purchased the government airship hangar at Key West and is having it moved to Miami where it will be erected on a 40 acre site near the municipal airport. The hangar is 250 feet long, 125 feet wide and 85 feet high. The cost of purchasing and reconstructing the hangar is \$33,500. The Goodyear-Zeppelin Company has agreed to send one of their baby dirigibles for training purposes as soon as the hangar is ready.

**O**N July 15th, the internal improvement board of the State of Florida deeded to the City of Miami 1,000 acres of the bay bottom of Biscayne Bay. Three hundred acres is to be filled in, and upon this a modern airport will be constructed. The balance of the bay is to be held in reserve and used when needed. One of the outstanding features of the airport in the bay is that it will be practically fog free as no fog settles over that portion of the bay.

**S**UNDAY flights are now being made by the Atlanta-Tampa-Miami airline of Pitcairn Aviation. Operations Manager Elliott and Line Superintendent Kerr are responsible for this new system, which expedites the business heretofore delayed in transit until Monday, and that which had been sent by the slower ordinary mail.

**T**HE airplane has proved of great value to the state and government forces to eradicate the Mediterranean fruit fly in Florida. Trained observers make an aerial survey and mark the location of all groves and vegetable fields on maps. The work of the ground forces is then checked against the

maps and an additional survey made to be certain that none have been missed. At a later date, it is stated, the infested area may be sprayed extensively from airplanes.

**T**HE *Southern Star*, Sikorsky biplane flagship of the American International Airways, recently made the first commercial air transport crossing of the Andes Mountains in South America flying at 19,000 feet to clear the mountain peaks. Capt. John K. Montgomery, president of the firm, with six passengers made the flight, which was part of the inspection trip being made by American International Airways preparatory to inauguration of regular South American service this fall.

## ARKANSAS

[D. E. SULLIVAN]

**A**MOTION picture record of an airplane trip made by O. W. McCaskill and Lieut. Charles M. Taylor, Little Rock, Ark., pilot and real estate man, was a feature of a recent meeting of the Little Rock Real Estate Board.

**M**AYOR PAT L. ROBINSON, Phil Love of the Love-Sultan, Inc., St. Louis airport engineers, and a committee of Little Rock business men selected a site for the proposed Little Rock municipal airport, for which local citizens voted on a bond issue of \$200,000 on August 19. The site includes 600 acres of ground for which the owners have agreed to accept \$125,000. It is about five miles from the business section of the city and about two and one half miles from the present government air intermediate depot. A house, which may be remodeled into airport headquarters, is in the northwest corner of the site. Several cleared plots in the immediate vicinity of the field present excellent facilities for emergency landing fields.

**H**UGH ELGIN, of Prescott, Ark., has been elected manager of the Little Rock Chapter No. 50 of the National Aeronautical Association, succeeding C. C. Morscheimer, who recently resigned. The new manager has assumed his duties. Charles M. Taylor, executive vice president of the Little Rock Chapter, has announced that since the employment of a full time manager, April 1, membership has more than doubled.

The towns of Russellville and Searcy have been assisted in planning their airports, and plans are now being made for a repetition of last year's Arkansas State Air Tour, which was a decided success in increasing interest in aviation throughout the state.

**T**HE Curtiss Challenger motor, which set the new world's record for endurance, has been adopted as standard for all stock model planes manufactured by the Command-Aire, Inc., makers of the Command-Aire planes at Little Rock, Ark. At present, 60 per cent of all ships turned out of the factory are so powered, and it is planned to equip 80 per cent of the planes with the motor in the near future, officials of the

(Continued on next page)



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LAMBERT-ST. LOUIS AIRPORT, ANGLUM, MISSOURI



(Arkansas News continued)

firm report. After this 80 per cent mark has been reached, only special built planes will be powered with other type motors.

#### Command-Aire Models Receive A. T. C.

THE Department of Commerce has issued Approved Type Certificate No. 184 for the Curtiss Challenger powered Command-Aire, and Approved Type Certificate No. 185 for the Hiss powered Command-Aire. Approved Type Certificate numbers for the Axelson and the Wright J6 powered Command-Aires are pending. All models of Command-Aire Planes are now approved and will be licensed direct from the factory.

COMMAND-AIRE INC., Little Rock airplane manufacturers, will open a branch plant in Santiago, Chile, Jan 1, 1930, Robert Snowden, president of the company, has announced. The plant in Chile will confine its operations to assembling planes fabricated in the Little Rock factory. Twelve men will be sent to the plant to start the mechanical force there.

Thirty-six planes will be delivered to the Chilean government in the first year, to be used as training ships in the government schools.

## LOUISIANA

[C. F. COOK]

THE charter of the Adjustable Wing Air Craft Company, Inc., with a capitalization of \$60,000 has been filed, and preparations are under way to commercialize the invention of John C. Bankston, of Shreveport. The invention which Bankston has developed is for the purpose of regulating the speed of an airplane by shifting the angle of the wings, and is said to be advantageous in bringing a plane down in a small space.

OPERATING a fleet of six-place cabin planes, Delta Air Service, Inc., of Monroe, La., has inaugurated daily passenger and express service between Jackson, Miss., and Dallas, Texas, serving the intermediate cities of Vicksburg, Monroe and Shreveport. Plans are being completed for extending the service to Meridian, Miss., Birmingham and Montgomery, Ala., on the east and Fort Worth on the west.

Delta's ground service is equipped by adequate shop facilities. At the Monroe airport, the company's headquarters, it has established and completely equipped a plant for the servicing of its fleet by a personnel of engineers, experienced aviation mechanics, and an inventory sufficient to meet any emergency.

THE New Orleans airport operated and maintained by the Texas Air Transport Company is to be improved by a \$70,000 development program now under way. Included in the project are new buildings, a night lighting system, drainage, new runways, and, eventually, a large hangar. John D. Blain, airport engineer, is in charge of the work.

A Spanish type stucco administration

building will be erected, and a landscaped terrace will allow passengers and spectators to watch the field operations. A new machine shop, thoroughly equipped for overhauling planes and motors, will be built. Planes will be stored in a new hangar, an all-steel structure, 80 by 200 feet, supplementing the present 100-foot square hangar. Beacon lights and floodlights will be installed, to be supplemented by a pointer beacon atop the Jung Hotel. Drainage work will also be undertaken, runways will be recovered with shell, and a new runway may be constructed.

## GEORGIA

[LIEUT. F. E. DAVENPORT]

#### The All-Georgia Air Tour

THE All-Georgia Air Tour, following two preliminary pathfinding tours, was successfully carried out July 23-26, after careful preparation. A squadron of fourteen planes, under the command of Major Luke Christopher, flew from point to point on its designated schedule, without a hitch in the entire program.

The tour accomplished all of its major objectives. For four days the planes cruised over the State, stopping at twenty-one cities and towns and circling a dozen others, all on schedule. Large crowds gathered at all points, and pilots and passengers were entertained along the entire route. Many towns, in preparation for the arrival of the tour, made efforts to have their airports in good shape, with the result that Georgia is now far ahead of expectations in the matter of adequate landing facilities, and with many more fields in the course of construction. The tour has established beyond question, the air-mindedness of the State of Georgia as a whole. On Friday afternoon, July 26, according to schedule, the planes returned and after circling over Atlanta in formation, landed at Candler Field. A final banquet, in celebration of the successful culmination of the tour, was held Friday night, at the Ansley Hotel.

Due to the great interest displayed, it has been decided to hold another tour in 1930. It is planned to include the four neighboring states of Alabama, Florida, South Carolina and Georgia, which will do much toward speeding development of airports and landing facilities in these states, in preparation for the event.

#### Atlanta Aircraft Factory Completed

FACTORY and office buildings at Atlanta have been completed and turned over to the Atlanta Aircraft Corporation, by the Truscon Steel Company of Youngstown, Ohio. With a capital stock of \$300,000 completely subscribed and underwritten, and the machinery installed, actual production will start shortly. The Atlanta Aircraft Corporation is under the leadership and direction of George H. Prudden and Edward Whitehead.

The main building, which is of steel and masonry design, will provide approximately 12,000 square feet of floor space. Each of the machines set up in this space will operate

under individual control, in place of by main shaft drive. The machinery being installed is capable of producing every part needed for the complete construction of an airplane.

While the complete details of the plane will not be released until the first plane is ready for exhibition, the general plan of design of the plane will be that of a trimotored, all-metal, low-wing eight-place monoplane. Three Wright Whirlwind 5-cylinder engines, developing 165 horsepower each, or three Wright Whirlwind 7-cylinder engines developing 225 horsepower each will provide the power. The plane will be streamlined, with a commodious cabin, comfortably upholstered chairs, and will include a washroom. The plane will carry radio and telephone connections. The speed is figured from 135 to 155 miles per hour, according to the power plant used.

A NEW airline to Jackson, Miss., has been added to the Montgomery-Atlanta route of the Southern Air Express. At Jackson, it will connect with the New Orleans-St. Louis division of the Southern Air Express. The plane to be used on this route will be a six-place Ryan Brougham, powered with a J-6 Wright 300 horsepower motor. The reserve cabin ship is a five-place Stinson Jr., with a Wright J-5. Eugene R. Klose is chief pilot for the company.

## TENNESSEE

[VIRGINIA MATTHEWS]

CONSTRUCTION on Tennessee Sky Harbor, the new airport near Murfreesboro, of the Interstate Airlines, Inc., operators of the direct line from Chicago to Atlanta, is progressing rapidly. Completion is expected during the early fall, according to J. M. Wulpi, division traffic manager for the company.

The roof of the large hangar is under construction, the stucco on the administration building is being put on, and electrical equipment is being installed. Many modern features, including a hospital, roof garden, and restaurant, will be included in the administration building.

Col. W. G. Schauffer, Jr., general manager of the Inter-State Airlines, Inc., with his family will reside at the Sky Harbor.

NASHVILLE'S first airplane sales display room was opened recently at the Stumb Motor Car Company when a Curtiss Robin was set up for exhibition. The plane has a 90 horsepower motor. Maj. John C. Bennett, Jr., is the Nashville representative of the Curtiss Flying Service.

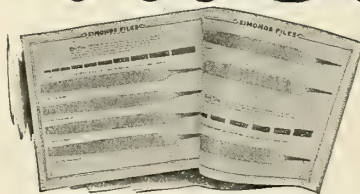
## DELAWARE

THE Bellanca Aircraft Corporation of New Castle, Delaware, recently announced that L. W. Ashton, formerly with the Baldwin Locomotive Works of Chester, Pennsylvania, has been appointed sales office manager of the Bellanca concern. Howard P. Young has joined the sales department as sales engineer and pilot.



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## KENTUCKY

[A. W. WILLIAMS]

IT is reported that the *Los Angeles*, with an escort of 27 planes, will come to Louisville September 30 to October 3, in connection with the annual convention of the American Legion in Louisville. It is understood that the Navy, Army and Marine air services will all be represented, and that there will be maneuvers with scout, pursuit and bomber planes.

C. D. CONVERSE, of Somerset, Ky., member of the Kentucky Air Board, recently made a report to Adj. Gen. William H. Jones, Jr., of the Halls Gap Airport, six miles south of Stratford, Ky., which was inspected by Converse following a crash on July 3. Mr. Jones stated that the Department of Commerce would be asked to inspect this field, which is operated by Johnson & Thompson Company. If the federal report agrees with that made to the air board, Mr. Jones will recommend that the field at Stanford be condemned. It is reported that said field is 200 feet wide, 600 feet long, with trees on the south end, and with safe landing possible only from one end.

THE Kentucky Air Board at a recent proposed legislation under which money collected as a state tax on gasoline used in airplanes be used for construction of emergency landing fields in the state. Under the present law the airman pays tax on all gas used, and this tax goes to the general road fund. It is believed that receipts could be given for all gasoline purchased in the state by aviators, and this would govern the amount to be turned over to the special fund for flying fields. Funds so collected would be used in matching funds raised by small towns in the construction of fields.

A letter was read and made public from Ernest N. Smith, general manager, American Automobile Association, regarding promotion of an aviation division of the body with clubs in all sections of the country.

PAT MORAN and associates, who established the Crescent Air Service, are operating from Bowman Field. The Crescent Air Service has four planes, including a Ryan and three Wacos, used in taxi and air transport service, and has been considering plans for equipping a plane for night flying service. John L. Dunlap and L. C. Ewing are also members of Crescent.

[J. ROGERS]

THE exhibition of commercial products at the Kentucky State Fair, September 9-14, will, for the first time include a display of airplanes in the merchants' and manufacturers' building.

NEARLY 100 Army, Navy and Marine corps planes, and as many from commercial ranks, will participate in the aviation program of the National American Legion which will be held in Louisville September 30 to October 3, it has been announced by Tyrone Mengel, chairman of the Legion aviation committee.

The dirigible *Los Angeles* has already

been ordered to Louisville for the convention and will be escorted by three flights of nine planes each—one from the Army, Navy and Marine Corps.

The programme includes an aerial sham battle with twenty-eight army planes participating, battle maneuvering and a smoke screen that will be laid over the city. There will also be air races, stunt flying and parachute jumps. One day will be designated as "commercial day."

## OKLAHOMA

[C. M. COLE]

AN announcement has been made of the prospective establishment of a chain of flying schools in Oklahoma to operate as the Great Western Air college. The project is headed by T. J. Chastain. The first school is to be located at Bristow, for which two planes have been purchased. Associated with Chastain are J. P. Kay, local oil supply man; E. W. Sharke of Tulsa; and C. B. Polk, southern representative for the American Eagle Aircraft Corp.

THE Braniff division of the Universal Aviation Corporation in June led the nation's air transport systems in number of passengers carried, according to recent figures released by the Department of Commerce Bureau of Aeronautics. The Braniff total for June was 1,416. These figures include only airline paying passengers. Unofficial figures show that during July approximately 2,000 passengers were carried by the Braniff lines.

An average increase of 100 per cent a month was accounted for by Deane Davenport, director of public relations for the company, through the following factors: increased inter-line service, the addition of several smaller cities to trunk line stops, and a slight decrease in tariffs on some divisions where traffic increased to a degree justifying the reduction.

Mr. Davenport has announced the extension of service by the Braniff-Universal airlines from the southwest territory to Denver and the Rocky Mountains. Ships leave Oklahoma City and Tulsa in the early morning, and connect at Wichita to continue through Garden City, Pueblo, Colorado Springs, to Denver, where they arrive the same afternoon. The new Braniff division of Universal will intersect the central division of the same corporation's air-rail great circle route from Chicago to the West Coast, at Garden City.

Oklahoma City and Los Angeles were connected recently with an eleven-hour air service, by the Braniff-Universal lines. Planes leaving Oklahoma City at 9 o'clock in the morning land at Los Angeles at 8 o'clock the same evening, with stops at Pampa and Amarillo, Tex., and Albuquerque, N. M. This service is 48 hours faster than train service between the two points. The distance is 1,500 miles. Braniff-Universal on July 25 also established direct airline connections between Oklahoma City and Winnipeg, Canada, through a connection with the Canadian-American Airways, Inc., at St. Paul, Minn.

A MODERN municipal airport was assured for Oklahoma City, July 30, when bonds to the amount of \$425,000 were voted for the enlargement and improvement of the present landing field. The city's program for improvement includes transformation of the present field into a port that will pass Department of Commerce regulations with an A-1 rating. Two hundred acres will be added, the field will be graded, and drainage will be arranged for an eight-way system of runways. The landing space will consist of a square mile, less 70 acres on the northeast corner which will be used for park purposes. A terminal building will be arranged so planes can take on or discharge passengers from an enclosed loading platform. The building will contain a cafe, waiting room, general offices for companies operating from the field, radio rooms and pilots' quarters. It will be flanked by hangars to hold more than 100 planes. Fences will surround the entire building section, with enclosures for spectators and parking cars provided.

The Braniff Airlines company will erect a \$90,000 hangar at once. Large storage hangars and offices will be built by the Curtiss Flying Service, and similar plans have been announced by Burrell Tibbs.

## TEXAS

[RUBY THOMPSON]

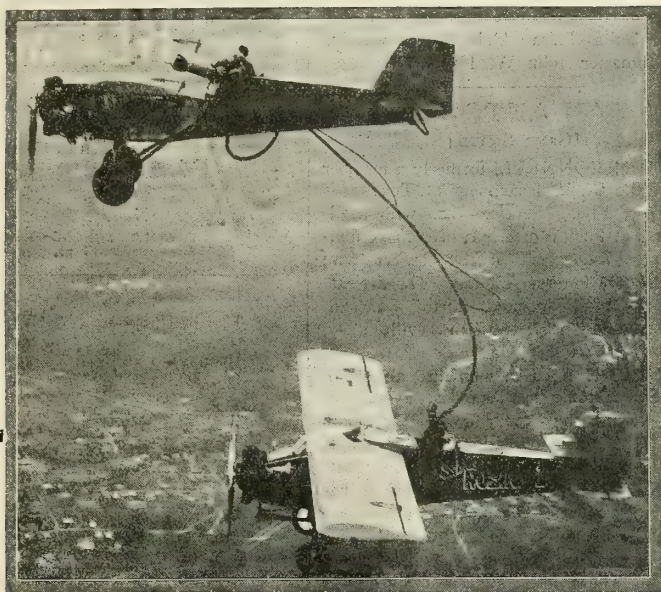
THE Fairchild Aviation Corp. has selected Dallas as the distributing point for all Fairchild products in the states of Texas, Louisiana, Arkansas, Oklahoma, New Mexico and Colorado. The Dallas office will represent the Fairchild Aerial Surveys, Inc., Fairchild Airplane and Mfg. Corp., Fairchild Aerial Camera Corp., and Fairchild Engine Corp., all subsidiary companies. The local office will handle all retail airplane and engine sales directly. Stewart Moir is manager of the company's interests in Dallas.

The Fairchild company manufactures three types of monoplanes and three types of biplanes. The monoplane group includes a seven-place cabin monoplane powered with a 450 horsepower Wasp, a four-place cabin plane with a Wright Whirlwind engine and a two-place open model with a Genet engine. In the biplane group is a two-seater open sports-training plane with a Kinner engine and a three-seated open sports-training plane with either an OX-5 or a Wright 150 horsepower motor.

Merrel Brock is chief pilot for the Dallas Fairchild branch. Willis Harrison is aerial photographer, and W. R. Bradford is sales representative.

BRANIFF AIRLINES, INC., has inaugurated passenger service between Dallas, Tulsa and Oklahoma City. According to Leo Rice, of the traffic division, and William Morrison, in charge of promotion of traffic, the first few days of operation has been such as to indicate the early use of additional lanes. The ships used are seven-passenger Hamilton cabin planes. Lines from Tulsa to San Angelo by way of Wichita Falls, and to Kansas City by way of Ponca City and

(Continued on next page)



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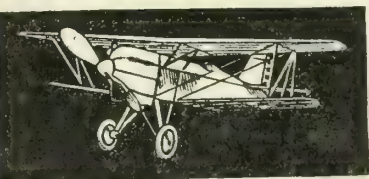
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(Texas News continued)

Wichita, Kansas, are also in operation. The reception committee greeting the first ship on the Dallas-Tulsa-Oklahoma run was led by Postmaster John W. Philip.

## SAN ANTONIO

[GENE SMITH]

FRED MCCONNELL, formerly a member of the traffic department of Texas Air Transport Flying Service, Inc., with headquarters at Fort Worth, has been made division passenger agent of the concern with headquarters in San Antonio. The division which he heads includes Austin, San Antonio, Corpus Christi and Brownsville.

## WINBURN FIELD, municipal airport of

San Antonio, has served an average of three visiting ships every day of the month since being put in operation 13 months ago, according to Wayne Parks, manager. During this time it has been operated it has served 230 planes. Gasoline sales now run 500 gallons a week. The city's outlay for improvements and salaries at the field totals \$30,000. The field is expected to be on a self-supporting basis from now on.

This field covers 185 acres of land, lying between Brooks and Kelly Fields, with four paved runways, an air mail hangar accommodating four planes, field office and garage, transformer vault, rest-rooms, revolving beacon, field flood light, manager's residence, paved roads, and minor improvements. Besides the city-owned hangars, there are five other hangars on the field accommodating 15 planes. Another hangar under construction will bring the housing capacity to 40 planes.

## FORT WORTH

[CAPT. W. H. SCOTT]

A NEW airport is being planned at McAllen, Texas, in the Rio Grande Valley. It will be a field of 200 acres. The town of Mission will bear part of the expense of the field.

COL. W. E. Easterwood, upon his return from a trip round the world studying aviation activities, announced a prize of \$25,000 for a flight from Rome to Dallas. The flight will be from Rome to New York, thence to Dallas.

The requirements of the flight stipulate that the plane shall bear in bold letters the legend, "Sponsored by Col. W. E. Easterwood." (Continued on next page)

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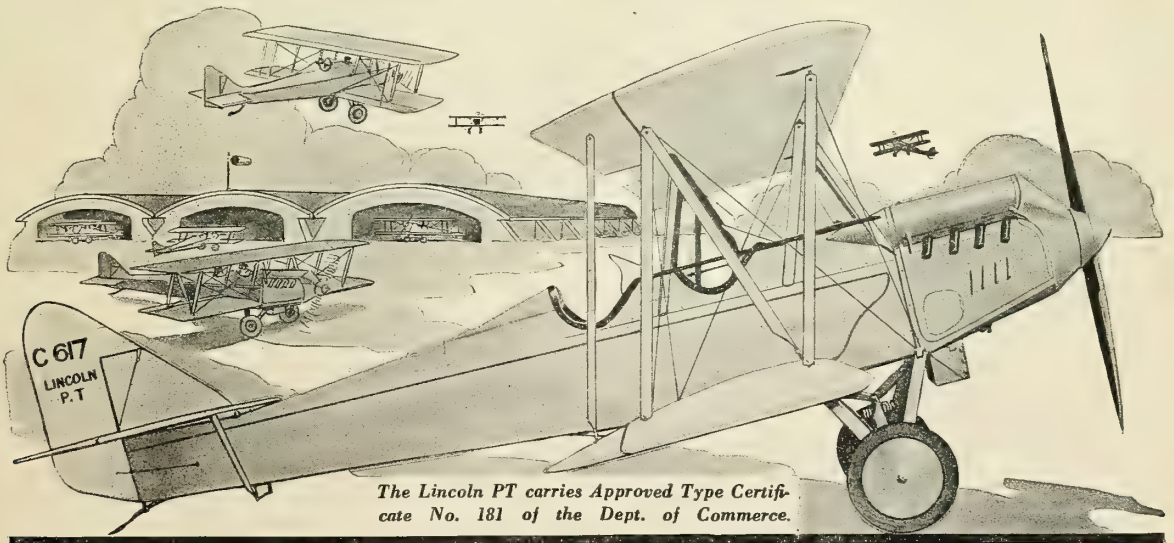
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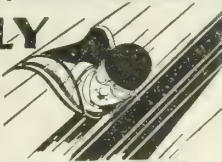
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*(Texas News continued)*

wood, Jr. The Texas Easterwood Rome-New York-Dallas flight." Not more than 72 hours is allowed for the stopover at New York. Provision has been made for an entrance fee of \$250 to show good faith; this money will be returned to airmen starting the flight and covering at least 500 miles of the trip. Contestants must be more than 21 years of age, can have assistants on the trip, and the plane must finish with its original crew.

A NEW airport was opened recently at Sweetwater, Texas. The new field is a level 200 acres, and a new 100 by 180-foot hangar has been erected on the ground.

THE Fort Worth Association of Commerce is planning an air tour in September which will stop at twenty towns and cities in south Texas. Hub Diggs, chairman of the aviation committee, is in charge of the flight and all arrangements are being made by D. C. Carlton, aviation secretary.

**SCHEDULE OF AIR RACES**
*(Continued from page 126)*

only once.

(3) Entrants in this event must have had an extended amount of experience in Balloon Bursting Contests.

(4) Prize of \$20 to the winner of each contest.

**EVENT NO. 34**
**CIVILIAN ACROBATIC EXHIBITION**

(1) Teams of three ships will give 20 minute demonstrations by invitation, one team each day.

(2) Prize \$300 each day for team flying that day.

**EVENT NO. 35**
**RACE FOR AVIATION TOWN AND COUNTRY  
CLUB TROPHY**
*(Speed and Efficiency Contest)*

(1) Open to cabin type planes of 800 cubic inch piston displacement or less; 0.5 pounds of day load per cubic inch piston displacement of motor must be carried by each contesting plane.

(2) 15 laps of 5-mile course.

(3) Prices \$2,000, to be awarded as follows: For speed—1st, \$500; 2nd, \$300; 3rd, \$200. For efficiency—1st, \$500; 2nd, \$300; 3rd, \$200.

(4) The efficiency award will be determined by the greatest number of merit points for each ship.

Between \$5,000 and \$6,000 will be available as prize money for glider contests, other special events and lap prize money.

**MATER'ALS**
**AIRCRAFT PLYWOOD**

 which complies with the requirements of your  
 engineering department.

**ALDER & BIRCH**

1/32" to 1 1/8"

 All our panels have one piece faces and are  
 clear on both sides.

Please inquire for samples and attractive quotations.

**EUROPEAN WOOD PRODUCTS CO., INC.**  
 404 Fourth Ave., New York

## EQUIPMENT

**NEW AND USED**
**MACHINE TOOLS**
**ELECTRIC MOTORS**
**STEAM BOILERS**
**AIR COMPRESSORS**
*Send for Complete List*
**DELTA EQUIPMENT CO.**

148 N. 3rd ST. PHILADELPHIA, PA.

**RARE BARGAINS. WE NEED THE SPACE.**

OX Pusher or left hand propeller.....	\$20.00
Pistons—OX5, OX2.....	2.70
Short Exhaust Stubs (each).....	1.25
Aluminum Intake Elbows (each).....	.75
Exhaust Push Rods (each).....	.50
Intake Push Rods (each).....	.75
Intake Rocker Arms (each).....	.75
Magneto Base.....	2.00
Cam Follower Assembly.....	2.00
Water Pump Assembly.....	8.00
Water Pump Wrenches (each).....	.50
Water Pump Shaft.....	1.50
Propeller Hub Assembly.....	12.00
Propeller Hub.....	6.00
Propeller Hub Bolts.....	.20
Propeller Hub Nuts.....	.10
Propeller Hub Wrench.....	.40
Complete Wiring Sets, right or left.....	2.25
Complete Valve Action Assembly.....	5.00
OX Piston Pins.....	.40
OX Piston Rings.....	.40
OX Socket Wrench (crank shaft nut).....	.40
OX Socket Wrench (propeller hub nut).....	.40
Dixie Booster Magnetos (each).....	15.00
Genuine Berling Magneto Points (each).....	2.00
Liberty Hose Clamp (per 100).....	.50
Wheels, 32 x 8 (each).....	8.00
Wheels, 36 x 8 Tires & Tubes (each).....	25.00
Wheels, 44 x 10 Tires & Tubes.....	25.00
Tachometer Drive (Warner).....	3.00
Tachometer Drive (S. A. E. straight).....	3.50
Tachometer Drive (S. A. E. angle).....	7.00
Altimeters, large.....	8.00
Oil Gauges (new production).....	1.25
Compasses (Dunne or G. E.), new.....	18.00
Turn Indicator, like new.....	50.00
Distance Thermometer, new.....	4.00
Plywood (waterproof) 1 3/2", 1 1/2", 1 1/8", 5 3/2" or 3/16", per sq. ft.....	.25
Jenny Axles.....	2.75
Jenny Radiators (Rhône-Turney).....	28.00
Jenny Radiators (Fettlers).....	9.00
Jenny Radiators (Harrison).....	15.00
Jenny-Hisso Radiators.....	20.00
Jenny Gas Tanks.....	10.00
1 M.F. Boat Radiator.....	15.00
Canuck Cockpit Cowl.....	15.00
Jenny Nose Plate.....	1.00
Jenny Fittings, any kind (each).....	.25
Standard-Hisso Radiator.....	50.00
Standard Gas Tank.....	10.00
Standard Metal Turtle back.....	15.00
D. H. Axles.....	5.00
1 T.M. upper wing wire (new).....	25.00
2 T.M. lower wings, right and left (each).....	20.00
A. C. Spark Plugs.....	.25
Mosler Plugs.....	.35

**HISSE PARTS.**

Crank Cases (Upper Half), Model A.....	110.00
Crank Cases (Upper Half), Model B.....	120.00
Crank Cases (Lower Half), Model A & E.....	60.00
Crank Shafts only, Model A.....	45.00
Crank Shafts only, Model E.....	60.00
Connection Rods (inner), Model A.....	10.00
Connecting Rods (outer), Model A.....	10.00
Connecting Rods (outer), Model E.....	15.00
Cylinder Assembly, B.H. or L.E. Bank.....	50.00 to 125.00
Piston Assembly, Model A or E.....	10.00
Hisse Hubs.....	10.00

Other Hisse and OX parts, in accordance with above prices.  
 As above prices are very low, all parts are offered subject to prior sale.

**HEATH AIRPLANE COMPANY, INC.**  
 1727 Sedgwick St. Chicago, Ill.

**PATENTS**
**PATENT YOUR IDEAS**

 Send me a sketch or simple model of  
 your invention. Satisfactory terms.

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**Z. H. POLACHEK**  
 234 BROADWAY  
 NEW YORK

REG. PATENT ATTORNEY  
 CONSULTING  
 ENGINEER

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New Issue

40,000 Shares

# AIRPORT LIGHTING INC.

(Incorporated under the laws of Delaware)

## COMMON STOCK

(No Par Value)

Transfer Agent:  
IRVING TRUST COMPANY  
New York

Registrar:  
TRUST COMPANY OF NORTH AMERICA  
New York

### Capitalization

Common Stock (no par value).....	Authorized	To be presently
* 10,000 shares reserved for sale under options to the management.	*100,000 shares	Outstanding
		90,000 shares

The Company has no Preferred Stock and no Funded Debt.

The following information is contained in a letter dated August 1, 1929, from Commodore F. G. Ericson, President of Airport Lighting Inc.

**Business:** Airport Lighting Inc. has been organized under the laws of the State of Delaware for the purpose of manufacturing and installing at airports a system of night lighting known as the "Donaldson Automatic Night Landing System." This system represents the successful result of many years of aeronautical research experience by Lt. John Shearman Donaldson, the inventor, internationally known as an aircraft engineer and the inventor of a number of military devices used by the U. S. Government.

The Company has acquired all of the pending applications for patent rights to the Donaldson system and Lt. John Shearman Donaldson, who is Vice-President of the Company, has contracted with the Company to transfer to it and without further cost any and all other inventions relating to the same subject matter heretofore made by him, and any and all future improvements which might be made thereon by him.

Black & Bigelow, Inc., leading Airport Engineers, in the report of their investigation of the Donaldson Automatic Lighting System advise that in their opinion this system serves a definite purpose by greatly increasing the safety factor of air transportation and believe that this system has certain advantages over the floodlighting system now commonly used.

**Industry:** All airports, to obtain a rating permitting night flying, must provide for night lighting; and the successful operation of airports, especially because of the rapid increase of both air mail and passenger lines operating on night schedules and the increasing use of privately owned planes, necessitates the installation of efficient night lighting equipment to assure the utmost safety in night flying.

Under present conditions, take-offs and landings from darkened or inadequately lighted airports, are considered dangerous, even with floodlights, for under certain conditions these floodlights create a false ground level. They are also dependent on the human element for operation and do not give the pilot enough or sufficiently certain information to insure the degree of safety in landing provided for with the mechanical devices of the Donaldson Automatic Night Landing System.

The Donaldson Automatic Night Landing System of ground lights, automatically controlled by a weather vane, indicates the direction of the wind, the location, length and contour of the runway, the gliding point on the field for landing relative to obstructions and landing triangulation; it aids the pilot in locating the ground level under snow or any other conditions and obtaining landing information by better visibility under fog conditions; the lights are non-glaring and obstructionless, economical in point of cost and operation, will greatly aid in the reduction of air transport insurance and will remove much of the uncertainty in landing at night which exists with the hand operated systems now commonly used.

**Management:** The management of the business will be in the hands of men who have successfully been identified with aviation for many years. Commodore F. G. Ericson, President, has been associated with the development of aviation since 1909; during the World War he represented the United States Air Board as well as the Imperial Munitions Board of Great Britain, in England and France. In the capacity of Chief Engineer, R. A. F., he directed the construction of the well known "Canuck Training Plane," thousands of which were used by the Royal Air Force and the U. S. Army Air Service. He was Chief Engineer of the Curtiss Airplanes & Motors Ltd., Toronto, and also assisted in the development of the F5L Flying Boat and directed the construction of a great number of these planes for the U. S. Navy. In 1918 Commodore Ericson was awarded a life fellowship in the Aeronautical Society of Great Britain. He is the possessor of the first F.I.A. Pilot's License, issued in Canada. Lt. John Shearman Donaldson, Vice-President, the inventor, has had wide experience with the United States Government in the Air Service and is internationally known as an aircraft engineer.

The Board of Directors consists of:

Frank G. Diffin,  
Aviation Engineer.  
Formerly Chairman, International Aircrafts  
Standards Board.

Lt. John Shearman Donaldson,  
Vice-President.

Harold H. Emmons,  
Chairman, Detroit Aircraft Corporation.  
Member Executive Committee, National Air  
Transport, Inc.

President and Director, Northwest Airways,  
Inc.

Director, Guaranty Trust Co., Detroit.

Commodore F. G. Ericson,  
President.

Edward Froede,  
Secretary-Treasurer.  
Vice-President and Director, Foreign Trade  
Securities Co., Ltd., New York.

Joseph A. Keenan,  
Alexander & Keenan, Atty's, New York.

Alexander Klein,  
Professor of Aeronautical Engineering, New  
York University.

Director, Inter-Allied Aeronautics, Inc.

Director, Aeronautical Industries, Inc.  
Director, American Cirrus Engines, Inc.

Paul Klopstock,  
President, Klopstock & Co., Inc., New York,  
Investment Bankers.

Harry Kraeling,  
President, Standard Steel Propeller Co.,  
Pittsburgh.

Major M. K. Lee,  
Capitalist, Baltimore.

Stephen J. McTague,  
Alexander & Keenan, Attorneys, New York.

C. Gilbert Peterson,  
Director of Sales, Metal Aircraft Corporation,  
of Cincinnati.

A. V. Verville,  
President, Verville Aircraft Corporation,  
Detroit.

C. Harold Wills,  
Capitalist, Detroit.

We offer these shares when, as and if issued and accepted by us, and subject to prior sale and approval of counsel. All legal matters in connection with this issue, except those relating to patent applications, will be passed upon by Messrs. Hornblower, Miller & Garrison for the Bankers and Messrs. Alexander & Keenan for the Company. All legal matters relating to the patent applications in connection with this issue will be passed upon by Messrs. Kenyon & Kenyon for the Bankers.

The Company has agreed to make application to list these shares on the New York Curb Exchange.

This stock is offered as a speculation

Price \$10. per Share

## KLOPSTOCK & COMPANY, Inc.

43 Exchange Place, New York City  
Telephone Whitehall 0620

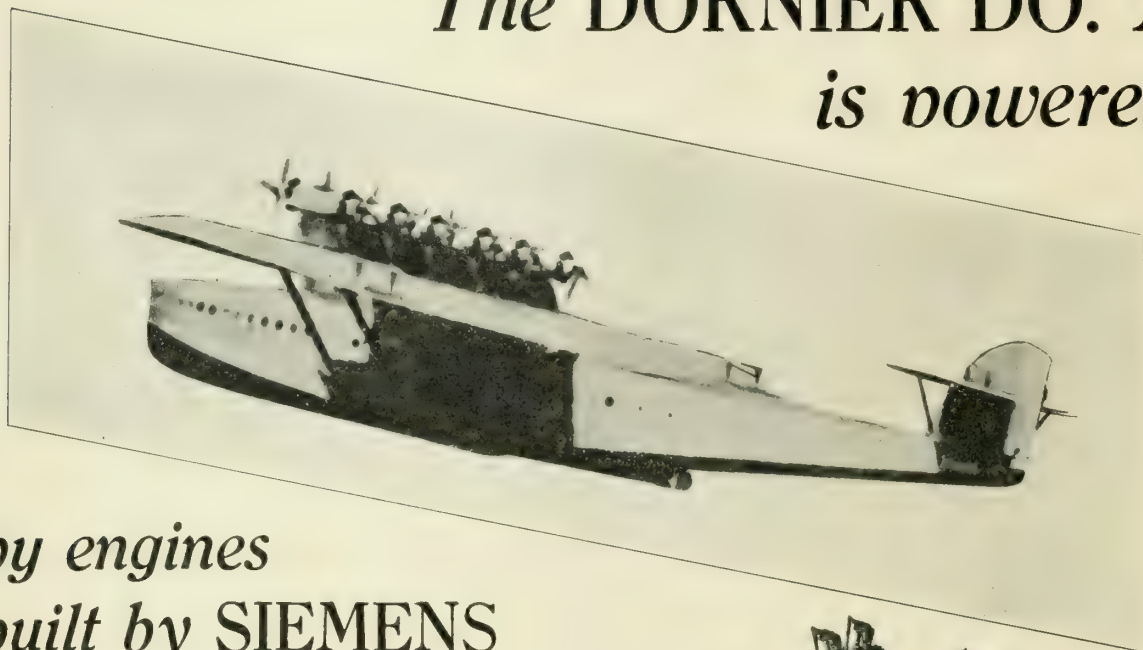
All information contained herein is not guaranteed but is obtained from sources believed to be reliable.

Say you saw it in AERO DIGEST





*The World's LARGEST Aeroplane ...  
The DORNIER DO. X  
is powered*



*by engines  
built by SIEMENS  
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**YANKEE  
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YANKEE "5" 83 H.P. 1710 R.P.M.  
YANKEE "7" 113 H.P. 1720 R.P.M.  
YANKEE "9" 128 H.P. 1736 R.P.M.

SMOOTHNESS OF RUNNING . . . EFFICIENCY . . . DEPENDABILITY

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75 West Street, N. Y. C.



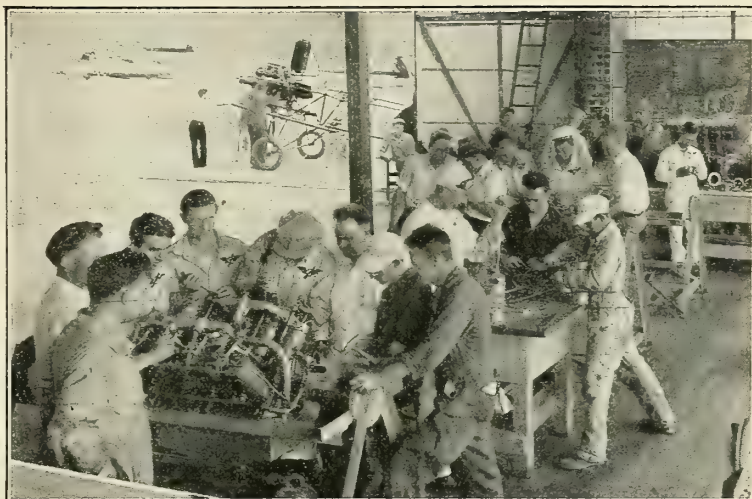
# MAKE SURE OF SUCCESS

## It's Yours If You Take Your Training at PARKS

It's a foregone conclusion that you'll select Parks Air College for your training when you decide to cash in on the amazing promise of success that aviation holds out to the mechanic—the man behind the man who flies the plane. Interesting work—a salary beyond your fondest expectations—the association of the most progressive men in any industry—a magnificent opportunity to drive your way to the heights in a new, absorbing and wealthy business—all can be yours. All that you need is TRAINING.

### There's No Other School Like Parks

The Parks Air College School for Airplane and Engine Mechanics is part of an institution that enjoys the highest rating of the Department of Commerce—that of Transport Ground and Flying School. Beyond the Government approval, however, lies even more convincing proof in the careers of scores of graduates who are helping make aviation history on the flying fields and in the aircraft factories in every corner of



the United States, in the far reaches of Canada and Alaska and in the tropical airways of South and Central America.

### Every Graduate of the Parks Mechanical School Is in a Job Today!

Where else can you find such a record? What other school for mechanics can point to such an achievement? What other school can give you such a proven guarantee of success? What other school, indeed, can offer you the magnificent shop and classroom equipment, the

skilled instructors, the carefully laid out courses that Parks places before you?

### Can't You See What Parks Training Offers You?

Of course you can. All that remains is to remind you of the need of haste. *You must act today.* Aviation is speeding along to new heights of prosperity and business success. It will carry you along with it. The earlier you join its ranks the farther it will carry you. Get into the game! Fill out the coupon below and then let us tell you more of the opportunities that Parks offers to you.

### MAIL THIS TODAY!

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Department 226 MT  
East St. Louis, Ill.

Send me your illustrated catalog. I am interested in Aviation.

Name.....

Address.....

City.....State.....



*Largest Civilian Air School in America!*

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*Parks Air College has been rated by the Aeronautics Branch, Department of Commerce, as an Approved Transport Ground and Flying School*



# WATER IN GASOLINE!!?

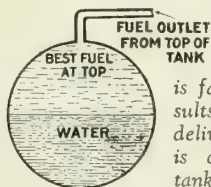
*Water and Gasoline do not mix—  
Gasoline floats on water—positive separation.  
Water settles to bottom of EVERY  
Gasoline Storage Tank*

## Why You Get Water In Your Ship

When gasoline is pumped from an ordinary storage tank where suction is from the bottom of the tank your ship is fueled with the worst gasoline in storage.

Water accumulating from condensation or other sources will be pumped out when it reaches suction stub.

Pump systems should be provided with water separators. But a water separator in the delivery line collects water and must be cleaned out periodically.



Failure to clean out water separator (and the human equation is far from infallible) results in water getting in delivery line—this water is delivered to airplane tanks.



## NO WATER In Your Ship From An AQUA (Fuel) SYSTEM

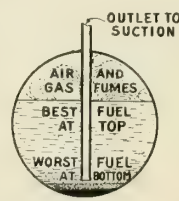
Good, clean, highly volatile and *bone dry* gasoline is always at top of the fuel in *every* storage tank.

The Aqua System is the hydraulic floatation system. It delivers gasoline from the *top* of the storage—*best* fuel in storage is always delivered to your ship.

The Storage tank itself is a water separator.

The Aqua System is simple and unique in principle. There is *no dependence* on the human equation. Design of System automatically eliminates any possibility of water ever entering any gasoline line.

Let an Aqua Representative explain the entire operation—ask for demonstration—you will understand why an AQUA SYSTEM does not depend on the human equation to prevent delivery of water to an airplane tank.



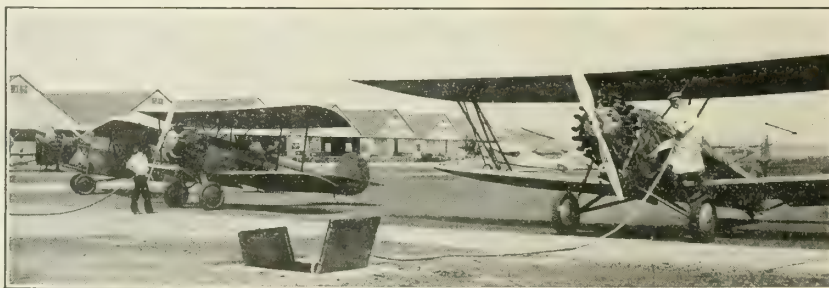
# AQUA SYSTEMS, INC.

CHICAGO

2 Lafayette St., New York, N. Y.

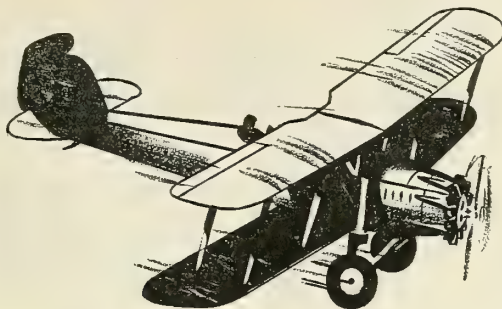
DETROIT

Dehydrated (Bone-Dry) Gasoline — Millions of Dry Gallons — No Forced Landing



Roosevelt Field—Aqua System—7 Fueling Pits are fed from one large underground storage tank through 3,000 feet of underground pipe.

Aqua System has been selected by:—U. S. Army Air Corps; Royal Canadian Air Force; Wright Aeronautical Corp.; Curtiss Aeroplane & Motor Co.; Roosevelt Field; N. Y. Air Terminals, Inc.; Schlee-Brock Aircraft Corp. (Detroit Municipal Airport); Pratt and Whitney Aircraft Corp.; Continental Motors Corp.; American Aero Corp.; Air Associates, Cicero Field, Chicago; etc.



# Announcing Curtiss Flying Service AERONAUTICAL UNIVERSITY

**A**UGMENTING the complete flying courses offered by the Curtiss Flying Service, the "Aeronautical University" will be opened in Chicago September 16th for day and evening Classes.

Organized primarily to create a supply of properly trained competent pilots, airplane and motor mechanics, technicians and executives for the affiliated units of the Curtiss-Wright Group of Aviation Enterprises, the Aeronautical University offers a superior training in every phase of aviation.

\*Transcontinental Air Transport, Inc.  
(The Lindbergh Line)

National Air Transport, Inc.  
Curtiss Aeroplane & Motor Co., Inc.  
Curtiss-Robertson Manufacturing  
Company, Inc.

Curtiss-Reid Aircraft Company, Ltd.  
Curtiss-Caproni Corporation  
Sperry Gyroscope Company, Inc.

Keystone Aircraft Corporation, etc.

Cessna Aircraft Company  
Wright Aeronautical Corporation  
Aviation Credit Corporation  
Curtiss Aeroplane Export Corporation  
National Aviation Corporation  
North American Aviation, Inc.  
Curtiss Assets Corporation  
Aviation Exploration, Inc.  
Curtiss Airports Corporation

The nation-wide character of the Curtiss Flying Service permits securing a class of instructor personnel with exceptional back-ground of aviation experience, covering many years, available only to an organization of this character.

**Offering: GENERAL COURSE.** For those who would make aviation their means of livelihood, regardless of whether they desire to become a transport pilot, technician, engine or airplane mechanic, designer, or executive.

**A BUSINESS MAN'S COURSE.** Lectures on vitally important aviation subjects—latest developments—aviation finance by experts. **SPECIAL COURSES.** Stress analysis, aviation drafting, celestial navigation, etc.



Both of these men are members of the Curtiss nation-wide organization.

Daily, under all conditions, Dale Jackson went out on this precarious "cat-walk" to inspect and tune up the Challenger engine . . . the pivotal member of the now famous quartet of Jackson, O'Brine, Robin and Challenger. Dramatic close-up shot made high in air on fifteenth day of flight.

# FLYING SERVICE

*"World's Oldest Flying Organization"*



# Curtiss sets Dramatic 420 hours

## Challenger Engine functioning perfectly when Robin lands on Eighteenth Day

420 hours in the air! Long enough to travel completely around the world!

173 hours longer than any aircraft had ever remained aloft . . . and still functioning perfectly when pilots reluctantly landed on the eighteenth day!

What greater test of performance . . . of the mechanical perfection of its products . . . could Curtiss offer to the world of aviation?

For it's a new engine . . . barely six months in production . . . another link in the long chain of Curtiss products

. . . that further proves the inestimable value of Curtiss' 20 years aviation experience . . . of Curtiss' ability to build both plane and engine that are leaders in their field.

### Stock model plane and engine

And remember! The record-breaking "St. Louis Robin" is a stock model Curtiss Challenger-Robin . . . it differs in no way from the standard plane you can buy from any Curtiss dealer!

Jackson and O'Brine needed a power plane with unusual powers of endurance.

A plane and engine that would function perfectly with a minimum of attention!

They found the qualities of comfort, sturdiness and innate stability they needed . . . in the Curtiss Robin . . . and the unbelievable powers of endurance they absolutely had to have . . . in the Curtiss Challenger engine!

And the same qualities have made the Challenger first choice among an increasing group of Curtiss enthusiasts. Have made it one of the most popular engines made for commercial or pleasure flying.

### Curtiss country-wide service

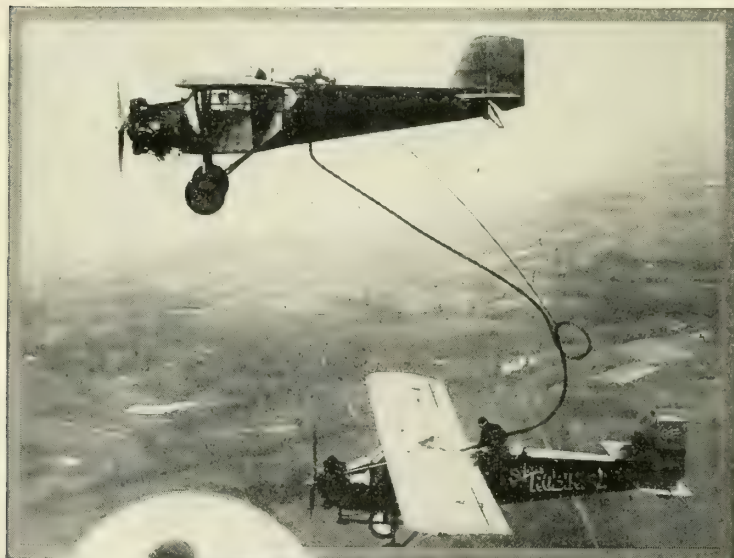
And with all its other advantages . . . the Challenger-Robin has behind it a system of service that no other plane or engine can offer.

If you fly a Curtiss ship or have a Curtiss engine in your plane . . . you are always within easy flying distance of complete repair, parts, and accessory service.

For the Curtiss country-wide organization has blanketed the airways from coast to coast with 40 service stations and over 85 dealers. And remember, too, that the Curtiss line covers planes and motors of every type for every purse.

Wire or write and we will immediately tell you the nearest point at which you can see and fly a Challenger-Robin. Curtiss Flying Service, Dept. 12, 27 West 57th Street, New York City.

Sales agents for Curtiss-Robertson Airplane Mfg. Co., Cessna Aircraft Co., Curtiss Aeroplane and Motor Co., Incorporated, Ireland Aircraft, Inc., Command-Aire, Inc., Moth Aircraft Corp.



Roosevelt Field—Aqua System—7 Fueling Pits are fed from one large underground storage tank through 3,000 feet of underground pipe.

Aqua System has been selected by:—U. S. Army Air Corps; Royal Canadian Air Force; Wright Aeronautical Corp.; Curtiss Aeroplane & Motor Co.; Roosevelt Field; N. Y. Air Terminals, Inc.; Schlee-Brock Aircraft Corp. (Detroit Municipal Airport); Pratt and Whitney Aircraft Corp.; Continental Motors Corp.; American Aero Corp.; Air Associates, Cicero Field, Chicago; etc.

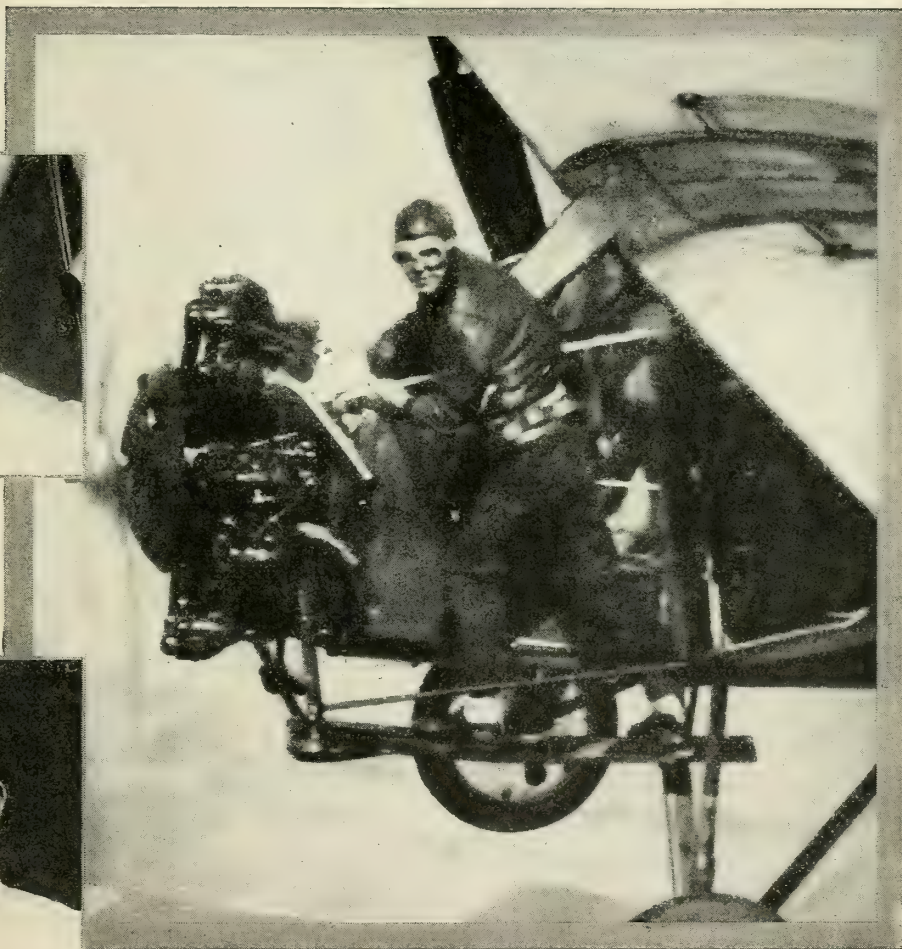
# Endurance Record . . . in the Air



Curtiss products — too! Forest O'Brine (top) and Dale Jackson (bottom) . . . co-pilots of the St. Louis Robin.



Both of these men are members of the Curtiss nation-wide organization.



Daily, under all conditions, Dale Jackson went out on this precarious "cat-walk" to inspect and tune up the Challenger engine . . . the pivotal member of the now famous quartet of Jackson, O'Brine, Robin and Challenger. Dramatic close-up shot made high in air on fifteenth day of flight.

## FLYING SERVICE

*"World's Oldest Flying Organization"*





## Copyists have failed to match its Amazing Performance

SINCE the famous Avian first took the air in 1922 and began a spectacular flying career, many designers have sought to copy this popular light plane. They have built many sisters, closely resembling the Avian. But they are step-sisters as soon as they leave the ground. In the air there is no resemblance to the original.

For the Avian is simply the happy creation of designing genius. A long record as a club plane, as a tourster, has given the Avian unquestioned right to its present position of leadership among light planes.

Perfectly balanced, stable, airworthy under all conditions. Safe, far beyond the factor demanded and accepted by the Federal authorities. Dependable, sturdy

enough for any man—the Avian is the experienced flyer's choice.

In it the fledgling masters the air in fewer hours. Lolling in the comfortable security inbred in the ship's design, the sportsman (and he doesn't have to be rich) soars through the sky, easily, pleasantly reeling off miles that are shorter than minutes—miles that are inexpensive and expansive.

Now this light plane is produced in this country under sole royalty rights as the Whittelsey Avian.

### *More Convincing Than Talk*

All we can say about the famous Whittelsey Avian is nothing compared to what this ship will tell you when you fly her.



THE OUTSTANDING SPORT AND



Climb into the roomy cockpit. Give her the gun. You never had a light ship get away and climb faster.



Stunt it. Stall the plane and try to throw her into a spin—watch the Handley-Page wing slots actuate, grab the air and literally lift the nose of the ship. Spins are out in a Whittelsey Avian. Float into a landing. Notice the low stalling speed. See how simple it is to put the Whittelsey Avian down safely in a small field. Taxi along rough ground and watch the sturdy, wide-tracked under-carriage take the bumps!

If you're an instructor intent on build-

ing an enviable reputation as a safe flyer, as an efficient teacher who is making money—if you're a sportsman who wants to fly for the thrill of flying and would like to keep your ship in any old shed—give the Whittelsey Avian more than a glance. It's the ship for you. Its price complete, Flyaway or F.O.B. Bridgeport, is \$4995.

A word of interest on your part will bring you detailed information concerning this popular light plane, its history, its specifications, its performance.

### *There's Money To Be Made*

We are proceeding with national distribution. Rich territories are still open to reputable dealers and distributors. For complete information concerning representation, sales plan and detailed story of this famous light plane write the Sales Manager, Whittelsey Mfg. Company, Department F-4, general office and plant, Bridgeport, Connecticut.



IN ENGLAND

TRAINING PLANE OF THE WORLD

Say you saw it in AERO DIGEST



At all the leading  
airports and aviation  
fields in the territory  
in which we operate  
you will find these-

# AMOCO PRODUCTS

AMOCO AERO OIL

\*AMOCO-GAS (AVIATION GRADE)

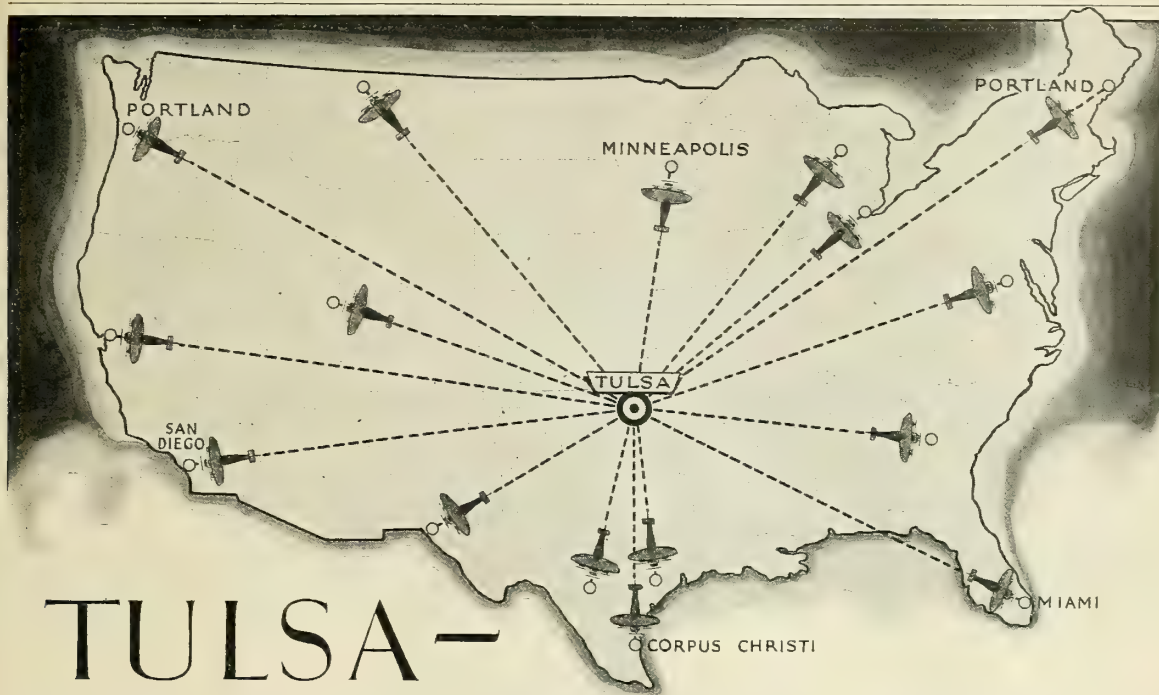
AMOCO-GAS

The Original  
SPECIAL MOTOR FUEL

*\*Amoco-Gas (Aviation Grade) was used by  
Chamberlin in his New York to Germany flight  
and by Major Dargue and associates in his Pan-  
American flight.*

The AMERICAN OIL COMPANY  
Affiliated with Pan-American Petroleum & Transport Company  
General Offices: Baltimore, Md.





# TULSA -

## The Nation's Natural Air Center

The United States will be the great airplane market of the future, just as it has been the great automobile market. The tremendous distances to be traversed—the high level of prosperity—and the manufacturing genius of the nation, will insure this.

To serve this great market best, the airplane manufacturer should locate at its hub, its geographical center.

Tulsa lies accurately at the hub of this mammoth future market. Just far enough south to obtain her unmatched year-round flying climate, Tulsa is equidistant from Portland, Maine, and Portland, Oregon—from San Diego and Miami—from Minneapolis and Corpus Christi. Recently two men flew from Los Angeles to Tulsa in 8 hours. Tulsa is almost equally close, by air, to every other point in the United States, Southern Canada and old Mexico.

Tulsa to date has made almost no effort to attract national attention to her advantages as an aviation center. Despite this lack of conscious effort, Tulsa is already one of the outstanding centers of national aviation activity. In volume of paid-for commercial air travel, the

Tulsa Municipal Airport since June 1st has exceeded every other airport in America. In one week of this period it exceeded the famous Croydon port, in England.

Another reason for this leadership is that Tulsa is the world's "Oil Capital," and a recent survey showed that of all classes, oil producers have invested most heavily in aircraft.

In addition to having the country's busiest commercial airport, Tulsa today has three other airports, two airplane factories, four aviation schools. She is national headquarters for a great transcontinental airway system, the Southwest Air Fast Express, whose big Ford transports fly from the Tulsa airport North, South, East and West—and is also served by the Universal Air Lines.

A modern, fast-growing city of 185,000 people, Tulsa offers the manufacturer every needed facility. A comprehensive industrial survey of Tulsa is now ready and will be furnished to manufacturers, bankers and business men, without charge. Special surveys on request. Write Tulsa Chamber of Commerce, Tulsa, Oklahoma.



1928 National Air Tour, Tulsa Municipal Airport



Hanger No. 1, Tulsa Municipal Airport



Interior, Spartan Aircraft Factory



Tulsa from the Air

Southwest Air Fast Express Ford Transport, taking off Tulsa Airport

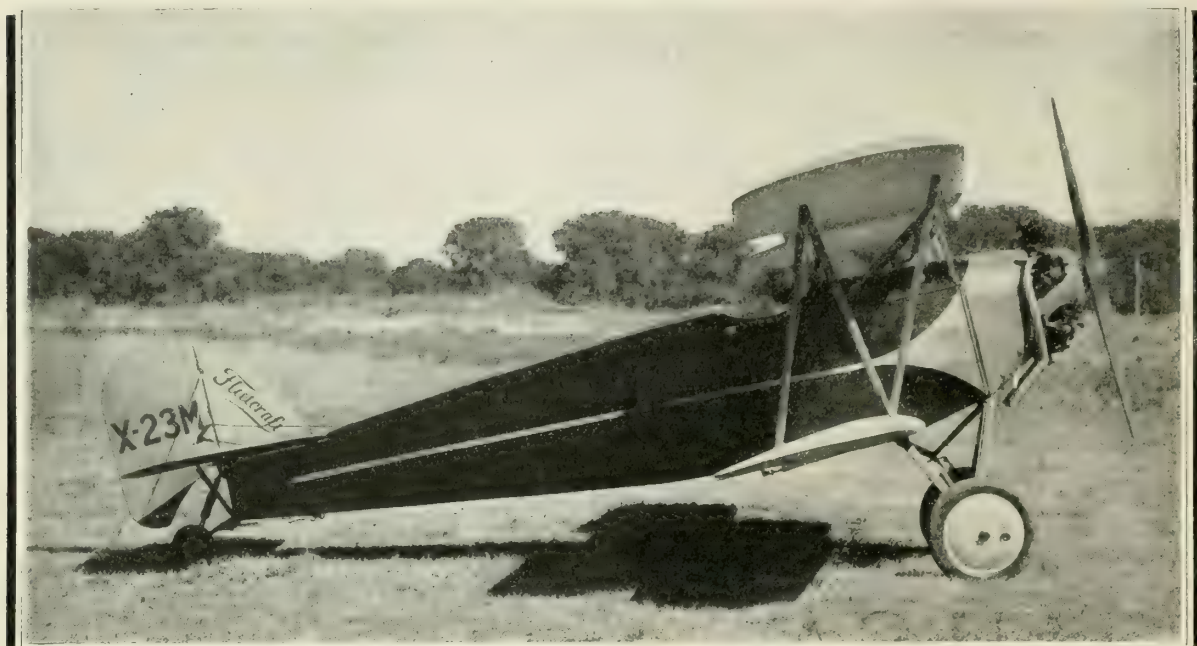


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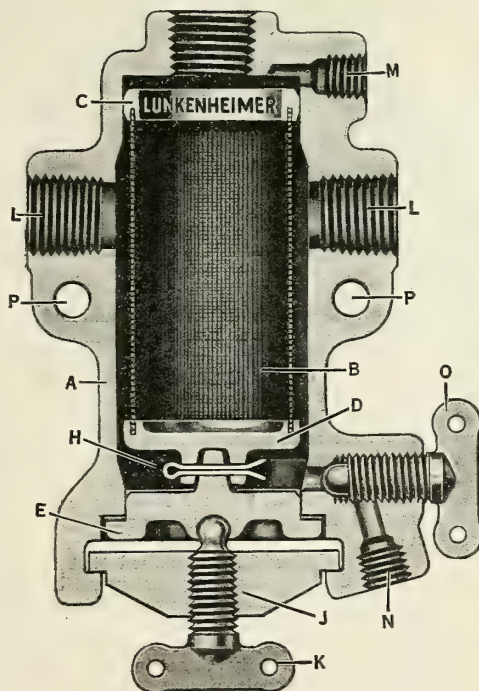
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Connection M, near top of body, is provided to supply gasoline to primer.



## OUTSTANDING FEATURES

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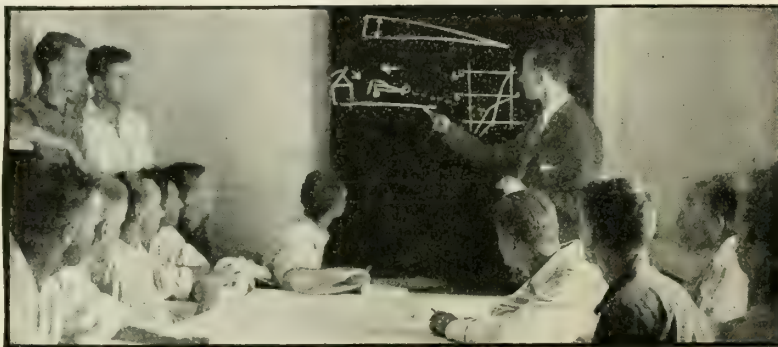




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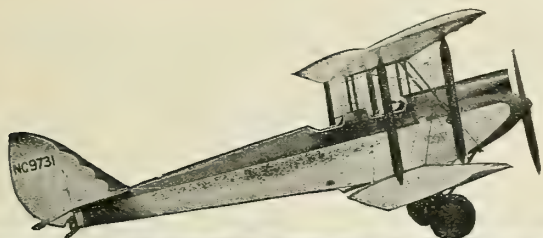
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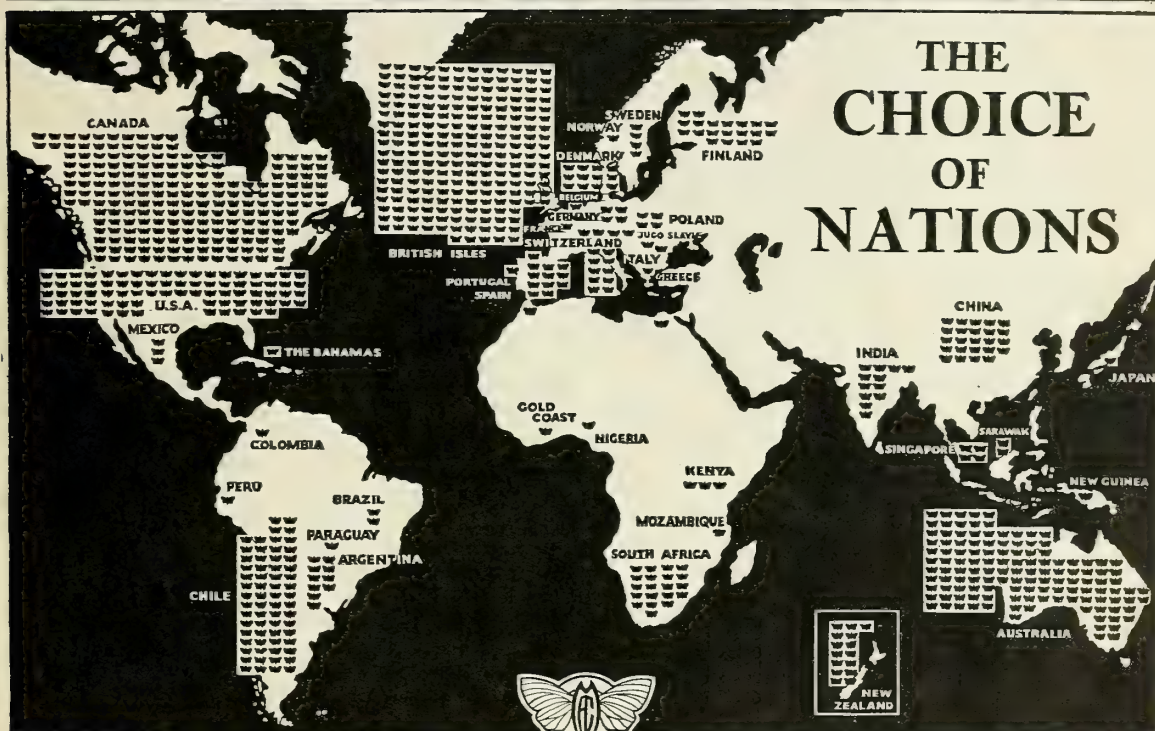


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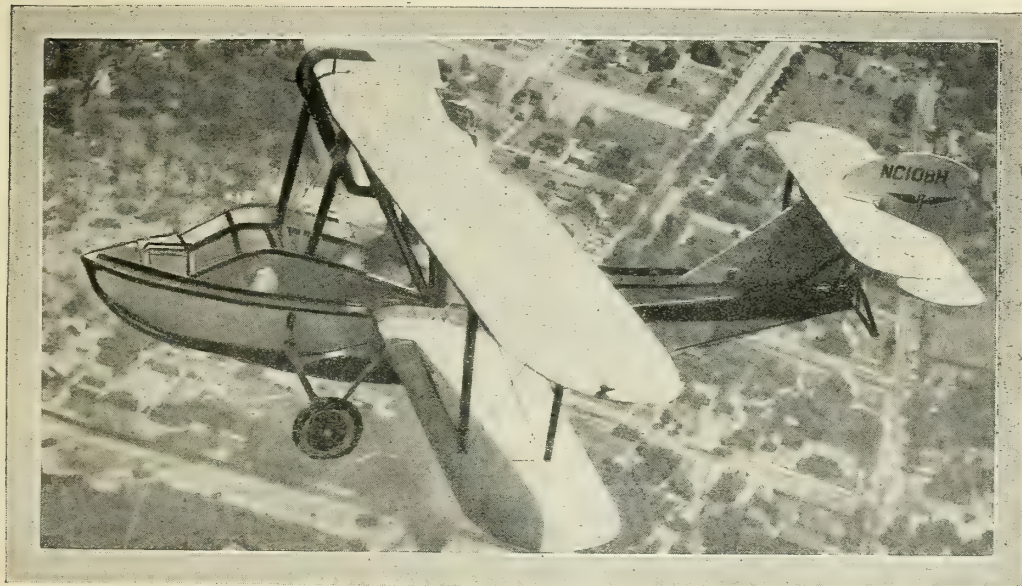
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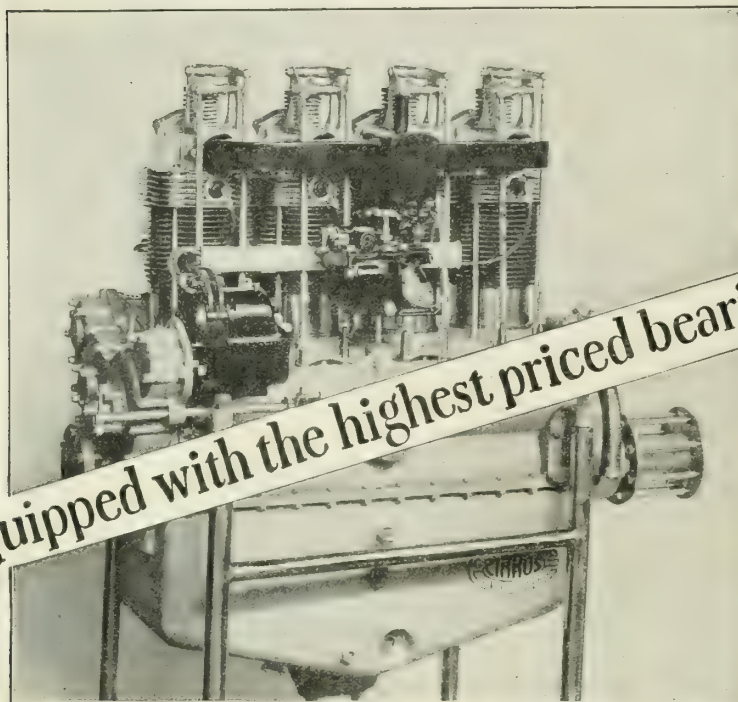
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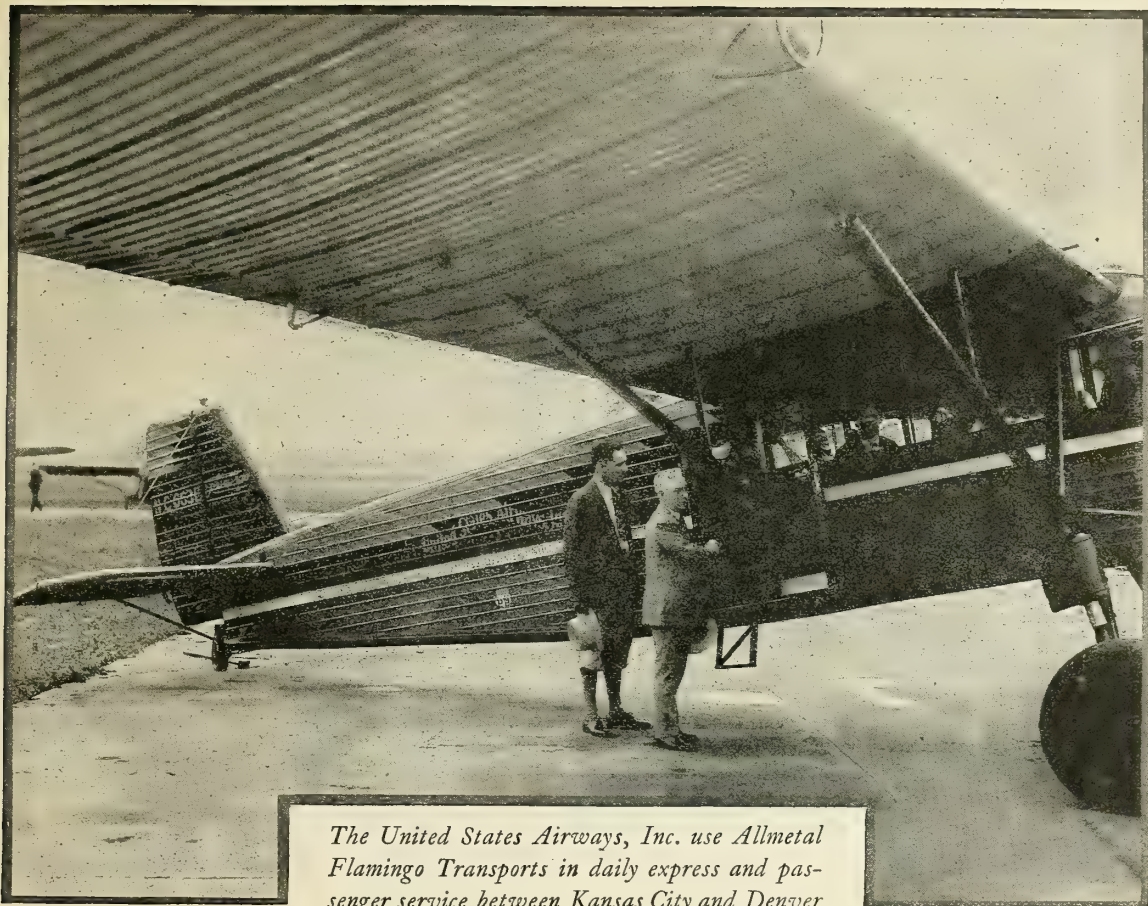
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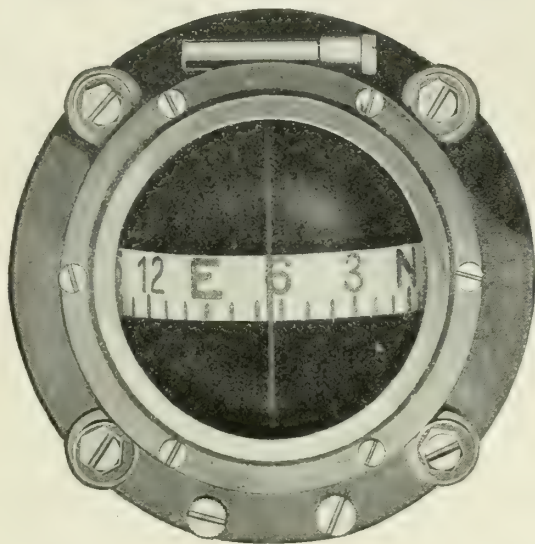
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## THE FLIGHT OF YANCEY AND WILLIAMS

(Continued from page 64)

Far below a trans-Atlantic steamer unveils a galaxy of lights.

It is 72 degrees warm in the cabin, although the outside temperature reads 40. They remove their heavy flying jackets and helmets, and open their shirt collars.

"Damn hot this time of the year," writes Williams. "Wish we had brought along summer underwear."

Dawn comes in very slowly. The sky becomes a rich pearl gray, and a red sun pops up directly athwart the dejected compass. As the horizon evolves, they watch their instruments more carefully, until they get their bearings. Then everything is fine.

"A gray dawn," Yancey writes, "Sign of a good day."

An unbroken carpet of clouds unfurls ahead of them. The ocean is not visible. Their altitude is 8,000 feet, and the upper cloud layer about 4,000 feet below. They make ready for breakfast—and, after an appraisal of the commissary stores, choose a bar of chocolate, coffee and an orange each.

Williams jerks his thumb toward the delicatessen roast chicken, and writes: "I never had a chicken for breakfast before, and I'd better not start now." He sees, presently, a patch of ocean, and writes:

"Do you know this is the first time I've ever been out to sea?"

Yancey stares at him: "Suffering cats, why didn't you tell me that before!"

They regret their forgetfulness in not bringing along shaving supplies, but change their shirts and collars. "Nothing like a clean shirt in the morning," Roger yells. "Sets you right up."

The altitude of the clouds increases; by nine o'clock, the crests of the highest are on line with the wings. Yancey pulls back on the stick a bit. They reach their ceiling—11,000 feet—and skim over the barrier.

Plotting his position, Yancey is gratified to note that the west southwest tail wing is continuing, giving them an added speed of about 25 miles an hour, and an air speed of 110 miles an hour at three-quarters throttle. "Doc. Kimball knows his stuff," he writes on the map.

The clouds begin to break up; by noon the sky is only partly cloud, and the weather holds good.

"How long do you think these clouds will last? To the Coast?" Williams writes.

"About that," Yancey replies. He sets his course for a point 20 miles north of Cape Ortegal, on the northwest coast of Spain. He estimates its distance then at 600 miles.

The afternoon wears on, and they sight several cargo steamers, all too far beneath them to hear their engine. About five o'clock, Yancey changes the course to round Cape Ortegal and parallel to the coast. A terrific thunder-head looms up off the starboard, 15,000 feet of hell-making clouds.

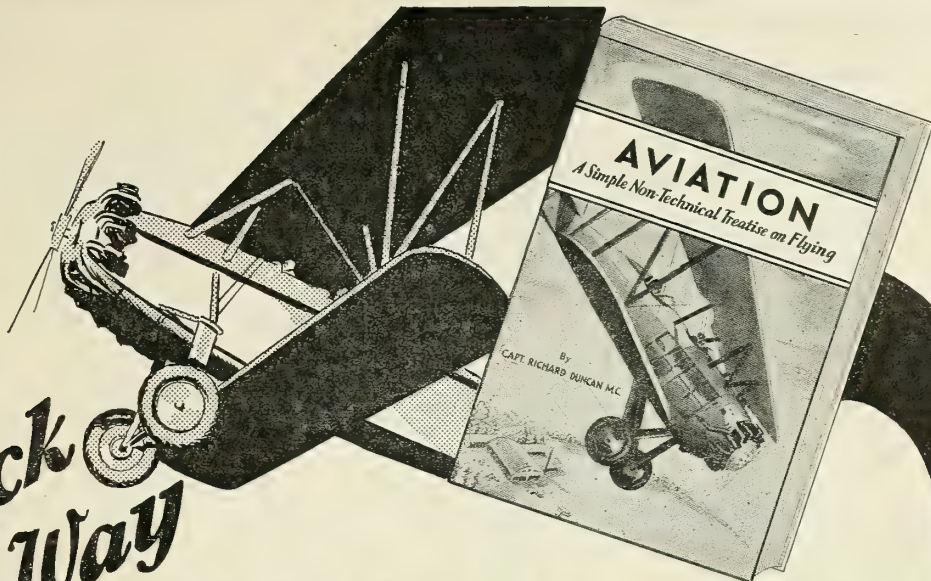
"Looks like a real storm in there," he writes. "Glad we didn't hit it in the dark."

About an hour later they head southeast in order to sight the Spanish coast, now quite near. Fifteen minutes later they sight it 12 miles away—a rough headland rising out of the sea. They are now just east of Cape Ortegal.

They head parallel to the shore again, holding a course five to ten miles off shore. "We will get the water distance record," Yancey writes, "if we land at Bayonne."

The two of them calculate their gas supply, and come

(Continued on next page)



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(Internat'l Newsreel Photo)

(Times Wide World Photos)  
Take-off of the Pathfinder from Old Orchard Beach on the historic flight to Rome, made by Roger Q. Williams and Captain Lewis A. Yancey, Navigator.

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(Continued from preceding page)

to the conclusion there isn't enough left to carry them through the night, to Rome. To continue means risking a forced landing, perhaps in the dark. They had requested the officials at the airports at Toulouse, Bayonne and Marseilles to be on the watch for them, but there was no way of learning whether these fields were equipped for night landings. Yancey scrawls a message on the map: "Suggest we land in the daylight, refuel and continue at once for Rome." Williams favors the idea. About 7:30 o'clock, they head in for the shore, seeking a likely landing place.

Yancey writes: "Try one of these beaches."

They nose in, and find a village near the shore.

They come down very easily—touching earth after 31 hours, 30 minutes in the air, after having flown 3,439 miles over water without once sighting land. It was a new long distance water record for aircraft.

"Well," announced Roger Williams, touching earth himself, "that's over."

WELL, after that, our young business men stayed in Santander over night, having found it impossible to get aviation gas before morning, and they were royally entertained. About noon-time the next day—the 10th—they took off for Rome, landing in the famous city about ten o'clock at night, and accomplishing, among other celebrated things, the phenomenal feat of keeping Mussolini waiting for more than two hours.

### 17½ DAYS IN THE AIR

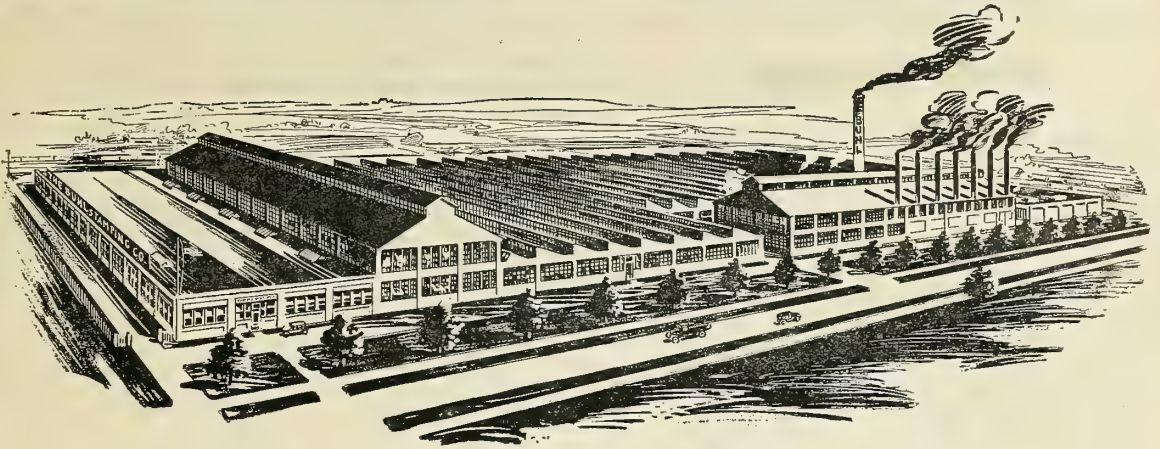
(Continued from page 69)

Upon examination of the compression pressures, it was found that the valves showed no leakage and the compression on all cylinders was equal. Carburetor and magnetos functioned perfectly throughout the flight. In other words, the condition of the engine seemed to indicate that it could have been flown many more hours without trouble.

The known cash income of Dale (Red) Jackson and Forest O'Brine apart from their salaries, has amounted to \$31,529. In addition they are being paid by a newspaper syndicate for the story of their 17½ days in the air. They received professional theatre offers, but they announced that these offers would not be accepted. Numerous gifts were sent the fliers at Lambert Field in care of the St. Louis Chamber of Commerce. The bulk of the side money—\$25,300—came from the Curtiss Aeroplane and Motor Company. When Jackson and O'Brine broke the old record, this company offered them \$100 an hour for every hour they were in the air in excess of the time of the previous record. The Curtiss-Robertson Airplane Manufacturing Company has made them a present of a special equipped Challenger-Robin.

One of the most remarkable points of the flight was the physical condition of both pilots after the flight. They were examined before the take-off and after landing by Dr. A. C. Leggat, medical examiner for the Department of Commerce. Much to the surprise of everyone, the hearing of neither pilot was affected. Their general physical condition was remarkable and at least equal to their condition when they took off. They appeared slightly nervous when they landed, but that probably was because of the excitement at the welcome tendered them. Increased pulse rates and a slight increase in blood pressure were also probably due to excitement rather than the physical strain of the flight. O'Brine weighed 138½ pounds before the

(Continued on next page)



**A**S THE aircraft industry progresses from infancy through adolescence and into its prime, its sources of supply assume an ever growing importance. Those sources which served an infant industry must grow as it grows, or they cannot continue to exist. That is one reason the Buhl Stamping Company has won and held a position in the front rank of those who supply metal stampings for aeronautical uses.



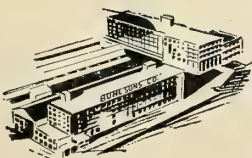
**BUHL  
AIRCRAFT  
CO  
MARYSVILLE**

This institution was full grown when the airplane was born. It has an enviable record of more than forty years behind it. It brings to aviation the stability, the soundness and the experience so essential in these changing years.

# BUHL

## STAMPING COMPANY

DETROIT, MICHIGAN



**BUHL SONS COMPANY  
DETROIT**

THE BUHL NAME has been identified with progressive industry since 1833. Buhl products today carry far more than the name alone—they preserve the priceless heritage of almost a century of manufacturing leadership and integrity.



# Immediate Success



Champion's new and revolutionary "Aero A" Spark Plug has won immediate success and acceptance for itself by the outstanding performance it gives in every type of aircraft engine.

With this new spark plug, Champion has brought to aviation a new and far greater factor of safety and dependability.

The "Aero A" Spark Plug cannot be broken in such

a way as to interfere with engine operation. Its carefully proportioned restricted bore, of special Champion design, affords an extra exposure of the center electrode and a short projection of the primary insulator, without interfering with its ability to withstand the maximum of heat and oil.

Its exclusive sillimanite insulators are absolute insurance against electrical breakdown. Its special analysis electrodes insure long gap life. Its two-piece construction includes molded copper gaskets which remain absolutely gas-tight.

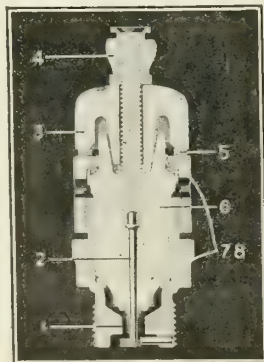
Its restricted bore construction makes it feasible to apply this one plug to practically all radial air-cooled engines, as well as to virtually all modern high compression water-cooled types.

Champion "Aero A" Spark Plugs provide a new factor of safety and dependability for your engine because they are the *only* spark plugs which *cannot* fail. They are bringing to Champion the same supremacy for airplanes that other Champion types have held for years in motor cars, motor boats and stationary engines.

## Champion Aero A Exclusive Features

1. Restricted bore. 2. Special analysis electrode. 3. Secondary sillimanite dome insulator. 4. Welded steel terminal. 5. Copper seal. 6. Primary sillimanite insulator. 7-8. Molded copper gasket seals.

Concentration on this one type spark plug (Aero A) for all aircraft engines enables Champion by virtue of large production, to offer this vastly superior spark plug at the extremely low price of \$1.25.



# CHAMPION

## SPARK PLUGS

TOLEDO, OHIO

WINDSOR, ONTARIO

(Continued from preceding page)

take-off and 140 after landing. Jackson took off weighing 154 and landed weighing 154.

A parade in their honor was viewed by approximately 200,000 people and rivaled the celebration accorded Col. Charles Lindbergh on his return to St. Louis after his flight from New York to Paris. At the present time they are making a tour of fifteen cities where they are giving refueling demonstrations. The tour is designed to promote aviation and to prove to the general public that the day of the reliable airplane and engine has arrived.

The official observer for the flight was Major A. B. Lambert, who represented the National Aeronautic Association. He was assisted by O. R. Parks, field manager of Lambert Field, and his assistant, Al Luig.

## MODEL DESIGNATION OF NAVAL AIRPLANES

(Continued from page 91)

The current manufacturer's letters are: A—Atlantic Aircraft Corp.; B—Boeing Airplane Co.; C—Curtiss Airplane & Motor Co.; D—Douglas Aircraft Co.; G—Great Lakes Aircraft Corp.; H—Hall Aluminum Aircraft Corp.; J—Berliner-Joyce Aircraft Corp.; K—Keystone Aircraft Corp.; L—Loening Aero. Eng. Corp.; M—Glenn L. Martin Co.; N—Navy Department; Q—Fairchild Aviation Corp.; R—Ford Motor Co.; S—Sikorsky Aviation Corp.; U—Chance Vought Corp.; W—Wright Aeronautical Corp.; Y—Consolidated Aircraft Corp.

There follows a descriptive list of all American-built naval airplanes (except obsolete airplanes) in service or under construction July, 1929.

The following abbreviations are used in the list of model characteristics given below: TB—Tractor Biplane. TM—Tractor Monoplane. PB—Pusher Biplane. Date—First Year of Manufacture. Conv't—Convertible. Land—Landplane. Following abbreviations apply to the type of engine used: (A)—Air-cooled. (W)—Water-cooled. (S)—Supercharged. (I)—Inverted. (G)—Geared.

The note "Battleship" indicates that the plane is used aboard a battleship and is equipped for catapulting; the note "Carrier" signifies that the plane is used aboard an airplane carrier ship and is provided with arresting gear so it can alight upon the carrier's deck.

Model	Manufacturer	Features	Engines	Remarks
FB-1	Boeing 1925	1-crew TB.....	(W) Curtiss. Similar D-12 PW-9	to Army
FB-5	Boeing 1926	1-crew TB.....	(W) Packard. Carrier 2A-1500 Radio	
F2B-1	Boeing 1927	1-crew TB.....	(A) P&W.... Production R-1340 XF2B-1	
F3B-1	Boeing 1928	1-crew TB.....	(A) P&W.... Carrier R-1340-B Production	XF3B-1
F4B-1	Boeing 1929	1-crew TB.....	(A) P&W.... Carrier R-1340-C	
F6C-1	Curtiss 1925	1-crew TB.....	(W) Curtiss. Similar D-12 PW-8A & P-1	to Army
F6C-2	Curtiss 1925	1-crew TB.....	(W) Curtiss. Carrier Twin float	
F6C-3	Curtiss 1926	1-crew TB.....	(W) Curtiss. Carrier Conv't Twin float	
F6C-4	Curtiss 1926	1-crew TB.....	(A) P&W.... Carrier Conv't Twin float	
F7C-1	Curtiss 1928	1-crew TB.....	(A) P&W.... Carrier Land R-1340-B	
XF8C-2	Curtiss 1929	2-crew TB.....	(A) P&W.... Carrier Land R-1340-B	
F8C-4	Curtiss 1929	2-crew TB.....	(A) P&W.... Carrier Land R-1340-C	XF8C-2
XFH-1	Hall 1929	1-crew TB.....	(A) P&W.... Carrier Land R-1340-B	Water tight monocoque metal fuselage
XFJ-1	Berliner-Joyce 1929	1-crew TB.....	(A) (S) P&W.... Carrier Land R-1340-C	Monocoque

(Continued on next page)

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a Knowledge of  
Welding Plays  
an Important  
Part!

As a result of research, experiments and tests, tubular steel—welded by the Acetylene method—has been recommended by the Aeronautical Division of the United States Department of Commerce and universally accepted by airplane manufacturers. Because of its strength, durability and minimum weight, be-



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cause it is the fastest and most economical method of construction, welded steel has been adopted by more than 90% of the airplanes in production for both the fabrication of the fuselage and in the construction of the all-steel cantilever wing.

Not only because the production of planes is steadily growing but because the trend in design and construction is toward the all-metal type, both welding and welders are increasingly important factors in the aviation industry.



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*Nearest by Air to Everywhere*



(Continued from preceding page)

Model	Manufacturer	Features	Engine	Remarks
XF2U-1	Vought	2-crew TB.....(A) Conv't Single float	P&W R-1340-B	Battleship & Carrier
XF3W-1	Wright	1-crew TB.....(A) Conv't Twin float	(S) P&W R-1340	Converted from Wright "Apache"
XHL-1	Loening	2-crew TB.....(A) 2-passenger Amphibion	P&W R-1690	Ambulance Cabin transport
XJA-1	Atlantic	1-crew TB.....(A) 3-passenger Land	P&W R-1340	Fokker "Super Universal"
XJQ-1	Fairchild	5-crew TM.....(A) Conv't Twin float	Wright R-790	
XJR-1	Ford	2-crew TM.....(A) 7-passenger Land	All metal transport (A) 2 Wright 1 P&W	
JR-2	Ford	2-crew TM.....(A) 10-passenger Land	3 Wright R-975	All metal transport
JR-3	Ford	2-crew TM.....(A) 10-passenger Land	3 P&W R-1340-C	All metal transport
NB-1	Boeing	2-crew TB.....(A) Conv't Single float	Wright J-4	Also gunnery
NB-2	Boeing	2-crew TB.....(W) Conv't Single float	Wright E-4	Also gunnery
XN2B-1	Boeing	2-crew TB.....(A) Land	Fairchild Caminez	
N2C-1	Curtiss	2-crew TB.....(A) Conv't Single float	Wright R-790-A	Production XN2C-1
NK-1	Keystone	2-crew TB.....(A) Conv't Single float	Wright R-790-A	Production XNK-1
NY-1	Consolidated	2-crew TB.....(A) Conv't Single float	Wright J-4-A or R-700	Flight & gunnery Similar to Army PT
NY-1B	Consolidated	2-crew TB.....(A) Conv't Single float	Wright R-790	NY-1 with NY-2 wings
NY-2	Consolidated	2-crew TB.....(A) Conv't Single float	Wright R-790	NY-1 with larger wings
XN2Y-1	Consolidated	2-crew TB.....(A) Land	Warner Scarab	Experimental training
XN3Y-1	Consolidated	2-crew TB.....(A) Land	Wright R-790	NY-2 with NY-1 wing bracing
OC-1	Curtiss	2-crew TB.....(A) Land	P&W R-1340	Converted from Army O1B Formerly F8C-1
OC-2	Curtiss	2-crew TB.....(A) Land	P&W R-1340	Converted from Army A-3 Formerly F8C-3
OD-1	Douglas	2-crew TB.....(W) Land	Liberty O-2	Similar to Army
XOJ-1	Berliner-Joyce	2-crew TB.....(A) Conv't Single float	Wright R-975	Battleship & Carrier
XOK-1	Keystone	2-crew TB.....(A) Conv't Single float	Wright R-975	Battleship & Carrier
OL-6	Loening	3-crew TB.....(W) Amphibion	(I) Packard 2A-1500	Similar to OL-3 Non-photographic Battleship & Carrier
OL-8	Loening	2-crew TB.....(A) Amphibion	P&W R-1340	Development of OL-6 Photographic
O2U-1	Vought	2-crew TB.....(A) Conv't Single float	P&W R-1340	Battleship & Carrier
O2U-2	Vought	2-crew TB.....(A) Conv't Amphib. Single float	P&W R-1340-B	Battleship & Carrier
O2U-3	Vought	2-crew TB.....(A) Conv't Amphib. Single float	P&W R-1340-C	Battleship & Carrier Flotation gear Diving bomber
O2U-4	Vought	2-crew TB.....(A) Conv't Single float	P&W R-1340-C	Battleship & Carrier Flotation gear Development of O2U-3
XPB-2	N. A. F. (Boeing)	5-crew TPB.....(A) Boat	(G) 2 P&W R-1690	Reconditioned PB-1
PD-1	Douglas	4-crew TB.....(A) Boat	2 Wright R-1750	Development of PN-12
XPH-1	Hall-Aluminum	4-crew TB.....(A) Boat	2 Wright R-1750	Development of PN-11
PM-1	Martin	5-crew TB.....(A) Boat	2 Wright R-1750	Production development of PN-12
XP2M-1	Martin	5-crew TM.....(A) Boat	3 P&W R-1680	Experimental Boat
P3M-1	Martin	5-crew TM.....(A) Boat	(G) 2 P&W R-1340-C	Production development of XPY-1
PN-11	N. A. F.	5-crew TB.....(A) Boat	(G) 2 P&W R-1690	Metal hull
PN-12	N. A. F.	4-crew TB.....(A) Boat	2 P&W R-1750	Development of PN-10

(Continued on next page)

When  
telephone poles  
reach up to grip  
your undercarriage,

THE length of a runway slightly misjudged—a ship that's slow to respond—a motor that's sluggish with carbon—and you swear and pray for those few extra revs that mean safety.

In tight places like these, a Paragon Propeller gives that added kick that pulls you up into the clear. Its blade outline provides a variable pitch that allows the propeller to rev up freely on the ground for thrust—quick take-off—climbability. In the air, the pitch washes in again and the extra speed is all in the ship. Generously sheathed with Monel Metal, the toughest workable alloy—each lamination carefully weighed and counterbalanced—natural wood or flat coach color—beautiful in appearance—smoothly efficient in operation—Paragon Propellers are unconditionally guaranteed.

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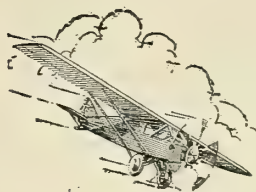
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# ALL-AMERICAN AIRCRAFT SHOW

Detroit City Airport and Hangar

APRIL 5-13, 1930

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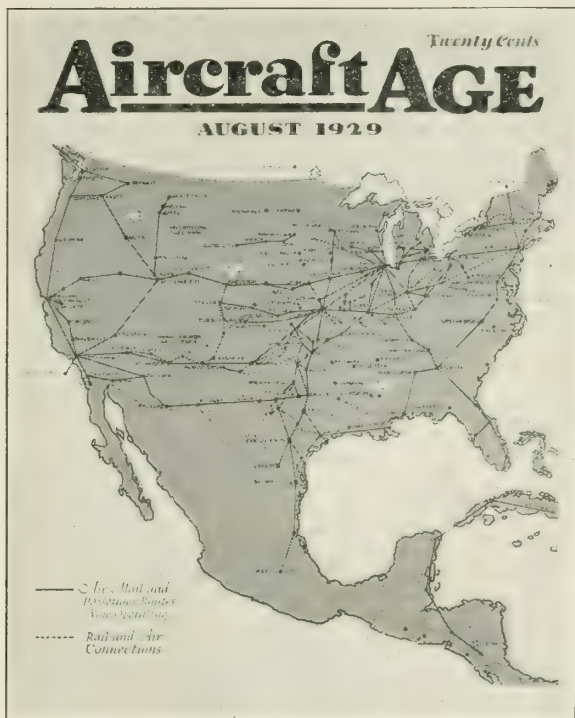
The 1930 All-American Aircraft Show at Detroit promises to be the greatest event of its kind in the history of aviation. With the entire City Airport given over to the exposition—exhibits housed in the municipal hangar containing 200,000 square feet of floor space, and demonstrations given from the flying field—the 1930 All-American Show offers manufacturers an unusual opportunity to place their ships and accessories before a vast and air-minded public.

At the 1929 All-American Show 58 manufacturers exhibited 102 ships at Convention Hall, while 141 manufacturers of accessories participated. From advance reservations for 1930 it is apparent that the exhibits will be greater still, both in the number of manufacturers represented and the number and variety of aircraft shown. Drawings for space are to be made during the Cleveland Aeronautical Exposition.

For full particulars apply to  
RAY COOPER, Manager

Suite 9022 Cleveland Hotel  
AUG. 24-SEPT. 2





The above cut shows the front cover of

# Aircraft Age

J. FRANK SMITH, Publisher  
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A monthly magazine dedicated to all departments of aviation.

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(Continued from preceding page)

Model	Manufacturer	Features	Engines	Remarks
XPS-2	Sikorsky 1928	2-crew TB..... Amphibion 8-passenger	(A) 2 P&W. R-1340-B	Development of XPS-1
PS-3	Sikorsky 1929	2-crew TB..... Amphibion 8-passenger	(A) 2 P&W. R-1340-C	Production develop- ment of XPS-2
XPY-1	Consolidated 1928	4-crew TM..... Boat	(A) (G) 2 or 3 P&W..... R-1340	
SC-1	Martin 1925	3-crew TB..... Conv't Twin float	(W) Wright. T-2 or -3	Similar to CS-1
SC-2	Martin 1925	3-crew TB..... Conv't Twin float	(W) Wright. T-2 or -3	Battleship & Carrier Larger floats
XSC-7	Martin & Wright 1926	3-crew TB..... Conv't Twin float	(G) (W) (S) Wright T-3	
TA-1	Atlantic 1927	2-crew TM..... Land	(A) 3 Wright. R-790	Similar to Army C-2 Cargo
TA-2	Atlantic 1928	2-crew TM..... Land	(A) 3 Wright. R-790-A	Similar to Army C-2A Cargo
T2D-1	Douglas 1928	4-crew TB..... Conv't Twin float	(A) 2 Wright. R-1750	Development of XT2D-1 Pilots in tandem
TG-1	Great Lakes 1930	3-crew TB..... Conv't Twin float	(A) P&W. R-1690	Carrier-torpedo & bomber Metal floats
T3M-1	Martin 1926	3-crew TB..... Conv't Twin float	(W) Wright. T-3B	Development of SC-2 Carrier
T3M-2	Martin 1927	3-crew TB..... Conv't Twin float	(W) Packard. 3A-2500	Development of T3M-1 Carrier
XT3M-3	N. A. F. & Martin 1928	3-crew TB..... Conv't Twin float	(A) P&W. R-1690	T3M-2 with air cooled engine
T4M-1	Martin 1928	3-crew TB..... Conv't Twin float	(A) P&W. R-1690	Carrier Metal floats
XT5M-1	Martin 1929	2-crew TB..... Land	(A) P&W. R-1690	Carrier Diving bomber
XT6M-1	Martin 1930	2-crew TB..... Land	(A) P&W. R-1680	Experimental torpedo plane
XTN-1	N. A. F. 1927	3-crew TB..... Conv't Twin float	(A) 2 Wright. R-1750	Carrier
XT2N-1	N. A. F. 1929	2-crew TB..... Land	(A) P&W. R-1690	Carrier Diving bomber

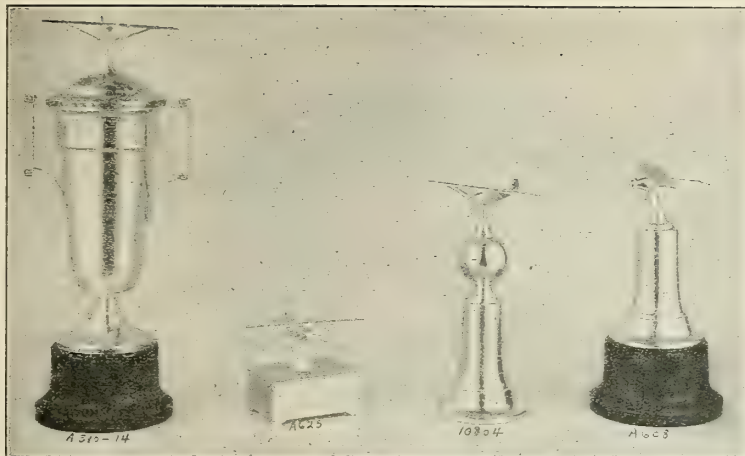
## NONSTOP FLIGHT IN A HANSOM CAB

(Continued from page 77)

derive no profit from them. They just keep them for sentiment and because they don't know where to park them. But I hit on a plan. I woke up the old gentleman and said, "Cabby, drive us to Rector's." The shock of getting a fare, the first in 13 years, was too much for the old man. He sunk back, shocked into insensibility. We summoned an ambulance and saw him carted away, while the usual New York crowd gathered. Everybody watched except the horse. He slumbered on.

Bill and I got aboard, pulled the chocks from behind the wheels, let off the brake, tested the horse controls, and yelled, "Contact!" The great flight was on. Or almost on. There was a slight delay; the horse hadn't learned what we wanted. He slept on peacefully. Bill said he might have developed carburetor trouble standing there so long—perhaps water in the jets. But I said no, his ignition system must be out of order. But I was prepared for emergencies. I had borrowed a Scintilla magneto from Tom Fagin, together with a booster mag and a silver pencil—that silver pencil of Tom's is standard equipment with all Scintillas. Well, I hitched up the Scintilla and the booster, got a piece of wire leading from the booster to the rear end of the horse, and turned the crank. Say, that horse hadn't been so surprised since the day they opened Grant's Tomb to visitors. He actually woke up and looked back at me. Then I tapped him with a fly-swatter to make him think a horse-fly had bitten him and that I had swatted the fly, thus proving myself a friend in time of need. He gazed at me thoughtfully and grate-

(Continued on next page)



310-14 x 10 1/4" High-\$15.00    A625-4 1/2" High \$10.00    10804-14" High \$15.00    A608-11" High \$11.50  
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### EDO EQUIPPED

(List revised to August 15th, 1929)

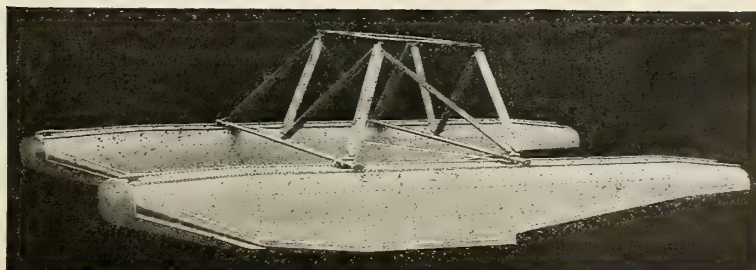
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 COMMANDAIRE 3C-3A  
 COMMANDAIRE 5C-3  
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 KEYSTONE PRONTO  
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 WACO 10

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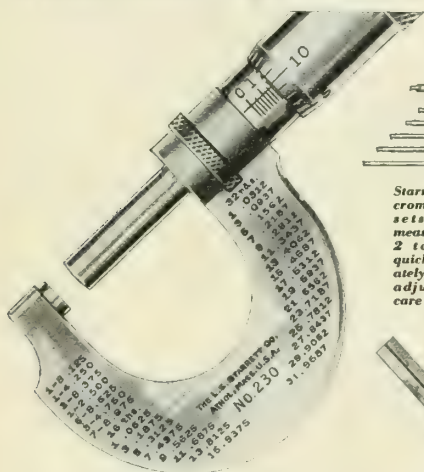


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# Use Starrett Tools

3081

(Continued from preceding page)

fully, brightened up, and with a sigh shoved off into traffic. We were away at last, headed for a record and the front page of the *Horsemen's Weekly*.

The controls were a little difficult to handle. At the speed we were making on the take-off, the ailerons were actually sloppy. When I pulled on the left rein, or control, the horse moved over to the left in a flat turn but didn't bank. I didn't think that was nice of him. I don't like flat turns. I said to Bill, "Bill, I don't like that. Flat turns are dangerous. If this machine does flat turns at three miles an hour, you and I are going to crash. Is your parachute firmly affixed?"

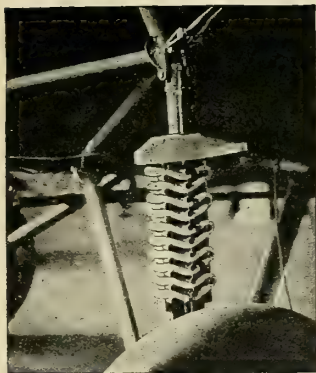
Bill looked down at the ground, which was reeling off beneath us at awful speed. "We're not high enough to jump," he cried. "We'll have to step." He was very pale.

"Worry no more, bold companion," I said. "My uncanny foresight has provided for everything. If step we must, then step we will." I reached into a hamper and took out a collapsible step-ladder. It collapsed at once, fell under a wheel, and was left behind in the traffic. The last I saw of it, a Mack truck was going serenely over it. If you happen to find it, don't bother returning it to me. Keep it as a souvenir; it may pacify you enough so you won't want to tear pieces off my cab, as they do off the airplanes.

I forgot to say that Bill had been trying to get off the hansom cab when this disaster overtook us. He had one foot on the ladder, one foot on the cab, and the other foot on the horse's upper works, just ahead of the tail, or rudder, when the ladder collapsed and almost threw him into the ether (a fellow had dropped a bottle of ether right there which he had been taking to a speak-gently in order to etherize some beer). Well, Bill only just got back into the ship, so unnerved that he almost collapsed himself, like the ladder. I was shocked, myself. There was Bill only just saved from falling into the void. There was a great big void on Fifth Avenue where they were digging up an old sewer to put down a more expensive one with nickel trimmings, done in buff and maroon, in the prevailing mode. Well, Bill barely missed that. However, as I told him, if he had fallen into the void, he would at least have had the satisfaction of knowing that he was in a modern sewer, not one of the old-fashioned ones. I told him, "Let us not take risks like that again. If we *must* die, if our time really has come, let us borrow one of Glenn L. Martin's MO-I's—and the uninitiated will think we died in an airplane. But the Navy would know better."

Now here's where a knowledge of Horse Cychology stood me in good stead. (Old-fashioned people spell this Psychology and even insist that the Wright Cyclone should be the Wright Psyclone.) I knew Horse Cychology and saw at once that this equine of ours had an inferiority complex. He didn't want to die on a main street, he didn't feel that he was good enough to die on Broadway, where hundreds of shows die each year; so his sub-conscious mind had been urging him to crawl into a side street where he could pass out unobtrusively. Knowing this, I aimed to keep him going on the main drag, for once I let him wander into a side street the flight would have been sunk due to engine failure. That's why the old cabbies always stick to Fifth Avenue. Let them wander into 55th Street, and they're done. The buyer for the glue factory is right on the curb. But I turned right on 42nd Street and drove over to Broadway, passing AERO DIGEST offices near the corner.

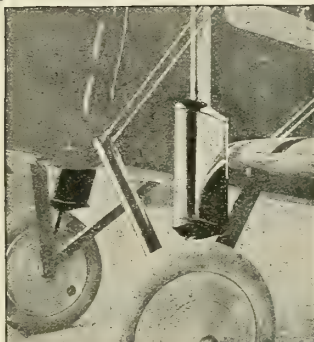
By that time it was necessary to refuel the horse. He'd  
(Continued on next page)



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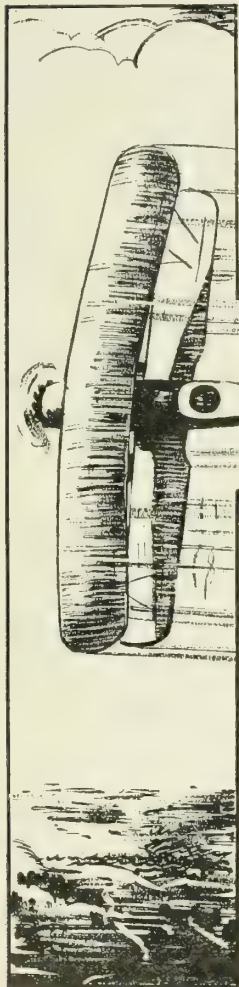
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(Continued from preceding page)

been flying for hours to go those two miles and was about out of oats. Not a sparrow was following us. I sent off a frantic radio to the Quaker Oats Company. "Send refueling plane up at once. Supplies exhausted. So am I." And I want to say right here that if it hadn't been for the heroism of Basham, pilot of the Quaker Oats wagon, we'd have been forced down right there. For the traffic was congested, congealed, and disgusted to such an extent that it was only by the most skillful piloting that Basham was enabled to swing beside us in the oats wagon and throw us the refueling hose.

Bill crawled out along the horse to get the hose. He experienced some difficulty in getting over the empennage or tail group, negotiated that successfully, and finally got right up to the nose of the ship. This made us nose-heavy, of course, but the wise old horse, skillfully elevating his tail, depressed the rear part of his fuselage enough to keep us on an even keel. I wired Charlie Lawrance of the Wright company, "Motor exceeds our expectations. 'Whirlwind' behaving beautifully." I had named our horse "Whirlwind" in honor of another good power plant.

Meanwhile Bill was sitting on the nose, holding on by the horse's right ear and waving his hand to signal that he was ready for the refueling hose. Basham let it down, or along, while Bill grabbed it and inserted the nozzle in our steed's feed-pipe. In no time at all the oats were flowing down, scraping slightly on the sides of the gullet, but flowing down nevertheless and notwithstanding. Old "Whirlwind" expressed his pleasure by lifting his right hind leg and kicking out with gay abandon, at the same time omitting a loud grunt of satisfaction, like a contented cow, only more so, and waving his tail vigorously from right to left and from the horizontal to the perpendicular and *vice versa* with a verve and vivacity and eclat that elicited loud bursts of applause from the assembled multitude who had been waiting there to see Grover Whalen go by. But they were equally pleased with the horse, and why not? Why not, indeed?

The refueler drew away, the hose was withdrawn; our nag expressing his reluctance to see it go by, whinnying pathetically and looking back at me with tears of regret and mortification in his eye. (He only had one eye, and couldn't see well out of that.) Then an icewagon drew alongside and let down a pail of chopped ice and two bottles of White Rock. This supply was most essential for the continuance of our flight, for both Bill and I had radioed our backers, "No ice, no flight. This is hot work." We'd been eating hot dogs and were already over-heated and feverish, though the mustard had proved invigorating and stimulating. I decided that the skins of the hot dogs were bad for men undergoing mental and physical strain, so we squeezed the meat out, inflated the empty skins, and threw them out as toy balloons, with little notes attached: "Everything going fine. Aiming for 500 hours or the Aquarium, we don't care which. Send up a bottle opener."

We used the ice with what I had provided in the hamper, and were ready for the night or a Turkish bath, by which time we had got down to 33rd Street in time to meet the evening rush. Which was unfortunate, for I had decided to take a bath. You see, I had taken a look at two of those endurance fliers when they landed, and had decided at once that whenever I went on any flight lasting over a week that I'd take a bath along so as not to shock any sensitive spectator when I landed. And I

(Continued on next page)

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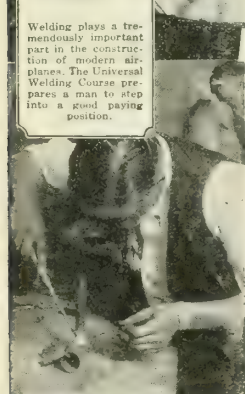
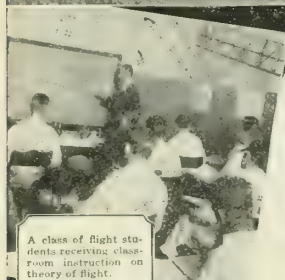
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(Continued from preceding page)

was about to leap into my canvas bath; in fact, I had disrobed and was scratching myself gently, when a sightseeing bus bound for Chinatown drew up alongside. At once all thoughts of Chinatown had vanished from the minds of a flock of old maid school teachers from Boston, and they voted one and all to continue down Broadway with our non-flop flight. Well, I tried to be nonchalant and light a Murad. But all I had was a Camel, and it's hard to be nonchalant in the bath, anyhow. In the future all non-stop planes should be equipped with window shades or "Occupied" signs.

All went well during the night, while we made 16 blocks in a southerly direction. Our navigation lights functioned perfectly, but we had to turn them off so Bill could get some sleep. I wished I had thought to bring along a copy of the Congressional Record so he could read himself to sleep. This Record is now being prescribed by doctors instead of laudanum.

Once during the night we refueled; ours was an especially dumb horse who had lived a lean life, or we would have had to refuel him twice. But being content with little, we refueled him just that once. The wagon let out half a bale of hay and a bottle of water. Only, the horse couldn't get the cork out of the bottle, not having had George Haldeman's practice. The poor nag was worried for a moment, until we passed a hotel where a sign read, "Use corkscrew in bathroom. Save the furniture." So we drove up to the bathroom and pulled the cork, thus saving a lot of Grand Rapids bedroom furniture for posterity. Which reminds me: Last year I camped in the Yellowstone where the bears are so tame they come up and eat your lunch, thus saving you from indigestion. Well, I had some beer along; and this one bear, I recall, swallowed two bottles of beer without removing the caps of the bottles! When he finally realized his error, you should have seen the aggrieved expression on his face. His look of consternation was pitiful indeed to behold.

Came the dawn. (I got that from a movie title. Rather nifty, eh?) Came the dawn and a wagon from Child's restaurant. On it sat one of the queens who flip the flap-jacks in the window. She flopped a flip-jack to Bill and me, which we caught like trained seals, while an attendant in a white suit, all but the neck and front, squirted coffee at us from a hose. They should send that lad back to a training camp for anti-aircraft gunners, for his aim is still bad. However, whatever didn't go in stayed out and materially aided our shaving. We simply rubbed Barbasol on the coffee and shaved—no brush, no lather, no rub-in, as the ads have it. One must indeed be a rugged pioneer to take advantage of every mishap on these flights and turn it into an advantage.

And then we were as worried as Mr. and Mrs. Martin Jensen. Our refooling plane failed to put in an appearance or an oat. We scanned the horizon in vain; we scanned it and divided it into feet and meters—the feet of pedestrians and the meters of taxi-cabs. Still it made no more sense than futuristic poetry. "We are sunk," I said.

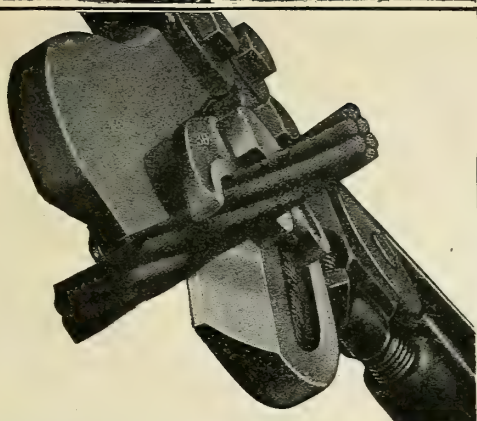
"Without a trace," said Bill.

"Not without a trace," I corrected him, for there were two traces connecting the horse to the cab. I radioed, "Oats! Oats! Half our kingdom for an oat—or a full horse!" No answer. We were missing on one plug. I didn't know what to do. Finally Bill's great mind found a solution—guaranteed to remove grease stains from the clothing.

"Tear open the seat cushions," he cried. "And be care-

(Continued on next page)





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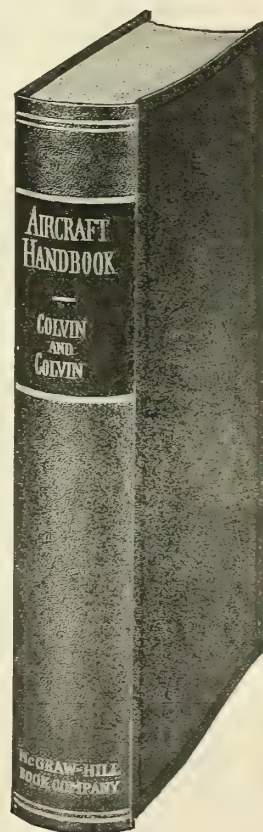
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68 EAST 131st ST., NEW YORK

(Continued from preceding page)

ful of the stuffing."

Frantically I tore them open. To my amazement and delight I found them stuffed with shredded wheat biscuits and corn flakes. I've always wondered who ate those things, for millions' of dollars worth are sold annually. Now I know. Nobody eats them. They are sold to the manufacturers of seat cushions. We fed our devoted "Whirlwind" a seat cushion, and he kicked up his heels in sheer joy and gave himself up whole-heartedly to uncontrolled merriment. In a moment we were all laughing heartily together.

And then we got a shock. From under the rear seat there rose before our bulging eyes the form of a very young and simple-looking man, unkempt, dishevelled, disheartened, disgruntled.

"Who are you?" I asked. He cringed before me, whining unhappily and wagging his tail.

"I am a stowaway," he whimpered in pitiful tones. "I wanted to do a very tiny imitation of Limburg, so I got aboard this non-stop plane, and here I am with a little American flag in my hand which I want to wave."

"Wave it, my dear," I said kindly, patting him gently over the head with a White Rock bottle. "Wave it as you go over the side and someone may pick you up. You've cut down the pay load of my ship—and I never do anything that doesn't pay. So over you go, dearie, and skip the gutter."

I threw him over the side. He fell with a bump, went boom, and was instantly seized by a man-eating vaudeville shark and thrown into vaudeville. The last I heard of him he had been side-swiped by a partially trained seal and was in the wings, fanning himself dejectedly.

Well, you'd have thought that was enough trouble for one morning. But no. No, no, no! The next thing that happened was that a Yellow Cab flew along beside us. Now, I didn't know it, but our horse had a natural antipathy to yellow. I believe a blonde had once got out without paying her fare. I didn't realize that, or I'd have given the nag a pair of pink-tinted glasses that I could have got from Dr. Scholz of Meyrowitz's. I was at fault there; a man should know his motor. He should at least be on speaking terms with the thing and invite it out to the house occasionally.

"Great heavens!" I cried to Bill, very politely, as I took off my union suit preparatory to swimming to shore in non-union hours. "We are undone! Alack and a-day!"

And Bill, looking quite undone, turned to me with a curtsy and cried, "Alas, fair sir, what ails thee!" Or something like that—I forget his exact words in the heat of the moment. But we were both over-wrought by the nervous strain of the flight and an unsettled condition in the stock market. Oh dear! What a moment that was in a young man's life! Will I ever forget it?

At this moment the brave Bill Ankoo again saved us from disaster. In all these endurance flights it is customary for the fliers to drop notes to their wives saying, "Tired and fed up. Wish you were the same." Or: "Worn out and needing a change; why not get a divorce while we are up?"

Well, Bill and I had clean forgotten to send notes like that—and Bill is single, too (the lucky fellow!). But when Bill reminded me of this lack I dropped a note to Myrle: "If United Aircraft goes up one point, sell." That added romance to the flight, and the New York Graphic came out with headlines: "CUPID ON GUARD"

(Continued on next page)



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of quality and  
service*

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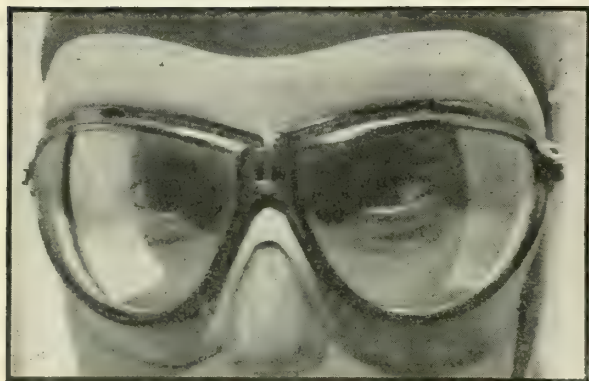
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The goggle frames are aluminum, enameled dull black like the inside of a camera. In every detail, the Willson Pilot Goggle is of advanced design, and precise durable construction. Yet it is priced no higher than many commercial goggles which do not meet Navy specifications . . . \$20.

There is also the Willson Observer, at \$10, exceptionally satisfactory in the service for which it is designed. If your dealer cannot supply you with these goggles, write direct to us.

Airports and flying schools find Willson Goggles a popular and successful line. Write for detailed information.

**Willson Products, Inc.**  
Aviation Division  
239 Washington Street  
READING, PENNSYLVANIA

(Continued from preceding page)

AS FLIERS TOIL ON." The subway morons simply ate that up.

Then Myrle herself, checking up on the old man, flew along beside us in a Checker Cab, accompanied by Charlie Levine. Myrle is now solo, through the patient and possibly painful efforts of Hal Emerick, of the Dungan School of Assorted Flying, Cleveland, and of the long-suffering David R. MacCauley of the Universal Aviation School in the same sainted town. (It took two schools to get this baby aloft in one piece, and the one thing she has bent to date is my bank balance.) Myrle wanted to know if I had paid my last insurance premium, upon which the tabloids came out with more headlines: "DEVOTED WIFE WORRIED ABOUT NON-STOP HUSBAND." And Charlie Levine wanted to know how much I would take for the cab, as junk, when I landed. I told Charlie he could have all that was left, after the souvenir morons had got through with it, for \$3.27. Charlie said that judging by what happened to the *St. Louis Robin* after the nit-wits had honored it with their knives that 27c was a fair price. I sold at once. I know my public.

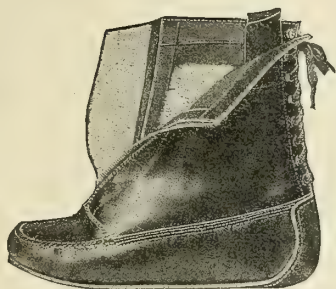
We had got almost to 14th Street when the refreshments gave out. I feared that we would be forced down, when Harry Bruno, cruising beside us in a new Packard donated by a gullible public, wrote on the side of his ship: "Cruise close to curb and replenishing hose will be lowered. The bold fellow had saved the day for us; though why save one day when there are 365 days in a year and an extra one in leap year, and land knows we need that extra day to escape in, which is why it's there. We drew in to the curb, the hose was lowered, and into us was pumped two gallons of soft drinks, with the saintly American words coming in by radio: "Be dry with Hoover, and we hope you like it. Signed: The Anti-Saloon League." Bill fainted, I reeled over to one side, and old "Whirlwind" leaned against a telephone pole. The great flight was nearly sunk right there, but we all three drank a glass of Kendall Oil and carried on, with a toast to that good scout Bob Loutt, of Kendall, who has rounded out a successful life by marrying Viola Curwood, the charming and beautiful daughter of the late James Oliver Curwood, a great little friend of mine. And listen, Viola, if I had been just 20 years younger, and single, which I'm not in either case, that bird Bob would have had a hard road to travel before I'd have let him get a passenger like you away from me. (Whenever Viola visits Lake Erie, I'm the one she elects to carry her from Detroit to Cleveland or *vice versa*. Best of luck to you both, you two good kids. Signed, Cy.)

But getting back to the nerve-racking flight: weather reports from Amelia Earhart, editor, traffic manager, pilot, and general good fellow, indicated storms ahead. We cruised along cautiously and entered a realm of deep gloom in which our navigation lights gleamed dimly. It turned out to be a roadside discussion on prohibition, which I refuse to write with a capital "P" because small case is much too good for it. Now, you know that nobody can see his way through one of those atmospheric disturbances known colloquially as a "discussion of prohibition." It's just the same as a fog, only less tolerant. The fanatic dries and the implacable wets, twin curses of a normally sane land, so cloud the air that nobody can make head nor tail of his direction. We flew in circles, our engine coughing and choking at times, and soon we didn't know where we were. We radioed Mabel Walker Willebrandt for directions, and she replied: "Also got lost in prohibition and sunk without a trace. Try Seymour Lowman; he

(Continued on next page)

# Cold Feet?-No Sir!

The latest design in fleece-lined Over-Moccasins.



## BASS

### Aviation Moccasins

Assure greater warmth without undue bulk.

The first aviation over-moccasin was designed in 1917 at the request of the United States Government and became the basis for the official specifications of the United States Army.

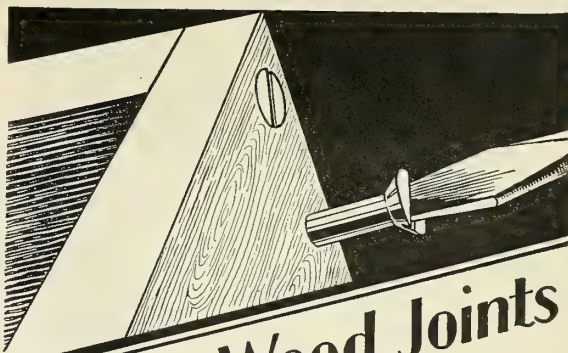
During the war Bass made all the Aviation Moccasins used by the Army and since has made them for the Army, Navy and Post Office Department.

These True Moccasins fit easily over regular shoes—are made from soft, chocolate Elk Leather and lined with Lambs Wool. Light but tough extension soles extending upward at the heel serve as protection at this point of wear. Laces in rear allow proper adjustment while the hookless fasteners in front mean ease and speed in putting on and taking off.

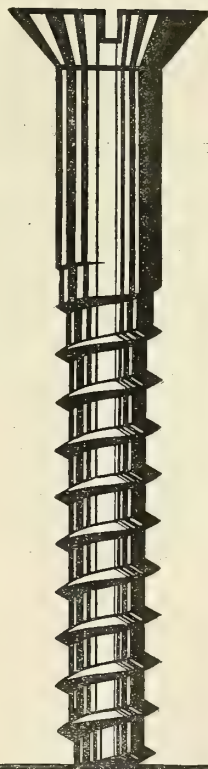
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## Pliers that are "Necessary Tools"

**M**ODERN practice in airplane construction and overhaul calls for highly specialized tools. The three special purpose Vacuum Grip Pliers illustrated above will quickly prove themselves indispensable in any shop where planes are in process of building or repair. Their efficiency, speed and time-saving features instantly put them in the list of "necessary tools."

Outside of their value in speeding up many difficult jobs, Vacuum Grip Pliers are a profitable investment because of their remarkable durability and long life. Special analysis Silico-Molybdenum alloy tool steel, hardened and tempered thru and thru, gives these pliers structural strength and wear resisting qualities not found in ordinary pliers made of open hearth steel that is merely case hardened or surface hardened!

**No. 87—Diagonal Cutters.** The many tough jobs encountered in airplane work including cotter pins, are handled with ease by these powerful cutters. Substantially built, so that their keen cutting edges remain in permanent alignment. Length 7 in. Price \$2.50.

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**No. 597—Valve Pin Pliers.** Also valuable for a number of pulling jobs. Has matched grooves at end and side of jaws for any size pin or wire. A little giant of strength and gripping power. Length 7½ in. Price \$2.50.

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  - ☐ One pair No. 597 Valve Pin Pliers, \$2.50
- Mark X in square to indicate pattern desired.

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(Continued from preceding page)

isn't sunk yet, but will be. And radio Doran if he hasn't done gone down." We radioed both and got no reply. Sunk, poor lads, I have no doubt. The fog continued, and we cruised in circles, like Tom Heflin. In the intervals between two speeches on the wet-dry issue, which had fogged the atmosphere still further, we landed. A man greeted us. He was magnificently attired, like Grover Loening, all but the spats.

"Where are we?" I cried, as Bill staggered from the cockpit and fell exhausted into my arms, while the patient horse leaned back in the shafts and fell asleep.

"You are at the Plaza," said the good man, fanning us solicitously with a worn-out umbrella. "You're right back where you started from."

"Thank heaven!" I cried happily. "It is a standard endurance flight. United Horseshoe should go up at least three points!"

## FOOL QUESTIONS FOR ALL

(Continued from page 70)

Mr. Edison's little Ask-Me-Another Contest, and I don't care who knows it. But I am compelled to admit that the questionnaire has become an important and ubiquitous element in our modern civilization. The things were originally invented, I believe, by the U. S. Army in order to keep certain members of the National Guard out of more serious mischief, and to demonstrate that it is probably inadvisable for everybody to be an officer, in spite of the high moral and social tone which might attach to an army made up entirely of officers. You remember, perhaps, the first great national questionnaire conducted by the Army to determine which members of the male population of these United States should wear shoulder insignia and which should peel potatoes. The questionnaire showed conclusively that practically everybody is half-witted, which fooled the enemy so badly that the war blew up twelve months later. After the war was over, the sixty per cent who won it organized the American Legion and now spend most of their time electing commanders.

The questionnaire has also enormously increased the efficiency of big business. By a system of test questions and such, many an applicant for the position of shipping clerk or elevator boy in a big corporation has been found out in time to be fit only for a member of the board of directors. The same goes for education. Some of the biggest of our educational manufactories are guarded at the door by three-headed questionnaires, which are supposed to separate the sheep from the goats and the Israelites from the Philistines. The big colleges are becoming as inquisitive as Ellis Island, for which you can't much blame them, since the demand for education seems to be exceeding the supply. The pedagogs use questionnaires also to demonstrate that some people need a tremendous lot of education and are also constitutionally incapable of acquiring it, which makes education much simpler.

The scientific version of the questionnaire is the Intelligence Test, which is principally devised to show that there isn't any. By means of an Intelligence Test a man is selected for the job in which he is least likely to be a nuisance or to do anything original. The test works beautifully where there is no intelligence, but in the presence of brains it explodes with a dull thud.

I feel like suggesting a few applications of the questionnaire method to critical moments in the individual life. There is, for instance, marriage. A man's entrance into

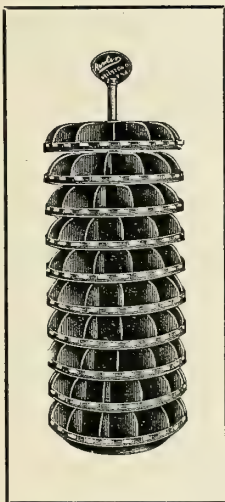
(Continued on next page)

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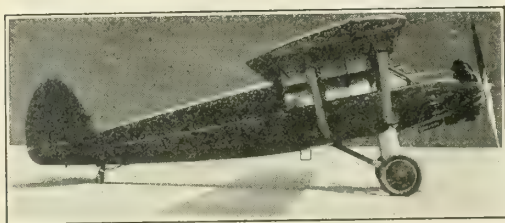
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**THE VERVILLE AIRCRAFT COMPANY**

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*(Continued from preceding page)*

matrimony should be conditional on satisfactory answers to the following questions:

1. Matrimony is an experiment—adventure—habit—argument—accident—prizefight—surprise package—poker game. Underline any or all that apply.
2. What's wrong with this sentence? A married man is the master in his own house.
3. Have you ever been kissed? How come? How much did it cost you?
4. Can you fry an egg? Will you?
5. Who invented stewed prunes? When was he assassinated?
6. If your wife wears a small felt hat and a bungalow apron on Tuesdays, what size stockings does she wear?
7. Explain the following equation: Income, \$30 per week; savings, \$5 per week. Income, \$70 per week; savings, \$2 per week—some weeks.
8. When is your future wife's birthday? When will it be ten years from now?
9. Can you buy five yards of nightgown flannel from a nineteen-year-old blonde in a Department Store without blushing?
10. When did you discover that you were going to get married?

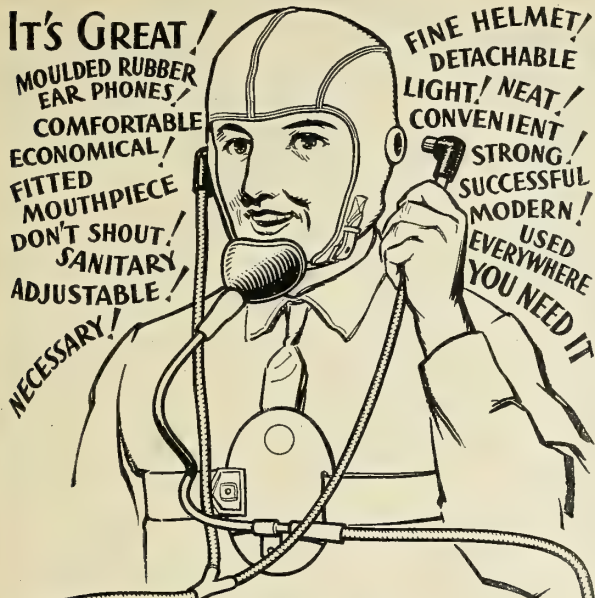
The same principle should be applied to the franchise. Every citizen should be required to pass the following test before voting.

1. Underline all synonymous terms in the following: Republican—Democrat—Politician—Incorruptible—Public Servant.
2. A statesman is (a) a friend of the people, (b) a stockholder in General Motors, (c) a slack-wire artist sitting on a fence, (d) a loud speaker, (e) a publicity agent. Underline all of them.
3. Who are these bozos you are voting for?
4. Who told you so?
5. What's wrong with this sentence: The ballot is an infallible means for recording the considered will of the people.
6. What will happen to your ballot? Will anyone be arrested for what happens to it? Why not?
7. Can you read your ballot? What difference does it make?
8. Who gave you that cigar?
9. What is the difference between a dry Congressman from New York voting wet and a wet Congressman from Georgia voting dry?
10. Is it true that Mabel W. Willebrandt is generally known as "America's Sweetheart"?

Another questionnaire is specially designed to keep undesirables out of a friendly game of bridge.

1. Do you peek once or twice before finessing?
2. Do you play them close to the vest or do you broadcast?
3. Do you renege on principle or from lack of it?
4. A slam is (a) an accident, (b) a miracle, (c) the correct return when your partner trumps your ace. Place a cross where the tragedy occurred.
5. When you fail to rescue your partner from the double of a one-bid, can you light up and look nonchalant?
6. When you talk across the table are you lying for your opponents or just laying for them?
7. When your partner passes, loud and vulgar, are you one of these obstinate guys or will you shut up?
8. Can you keep score, or do you still trust your neighbors?

*(Continued on next page)*



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These prices include best grade soft leather helmets and adjustable tube and mouth piece for cowl installation. With adjustable breast plate, speaking tube and mouth piece, \$2.50 additional for one way set.

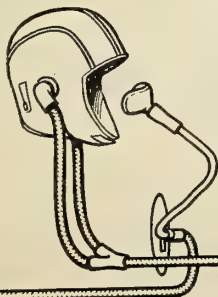
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Please send (.... quantity) Johnson Communicating Sets.

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### Table of Contents

CHAPTER ONE	Airfoils, Lift and Drag
CHAPTER TWO	Control
CHAPTER THREE	Inherent Stability
CHAPTER FOUR	Interesting Points in Design
CHAPTER FIVE	Construction of Airplanes
CHAPTER SIX	Practical Flying— The Slotted Wing
CHAPTER SEVEN	The Weather and Aviation
CHAPTER EIGHT	Airports—Airways—Safety
CHAPTER NINE	Pilot Licenses—The First Lesson
CONCLUSION—Terminology.	

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"Am in receipt of your book 'The Modern Airplane' and wish to say that it is very interesting and I have enjoyed reading and studying it so much."  
W. A. KERR, JR., COTULLA, TEXAS.

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2508 University Ave.,  
Saint Paul, Minn.

Here's my dollar. Rush me postpaid a copy of "The Modern Airplane."

Name (Print) .....

Address .....



(Continued from preceding page)

9. Do you settle in cash or by check?

10. Why don't you stay home and play Canfield?

Systematic and scientific investigations like these will eliminate hazards, prevent unpleasantness and encourage brotherly love. They will also make you quite unpopular with the neighbors, which is usually unnecessary. But they can also serve a national purpose, and I have in mind particularly a questionnaire to be submitted to admirals. Any sort of admiral will do. Old admirals and young admirals, deep-sea-going admirals and swivel chair admirals. Retired admirals and young gentlemen who would like to become admirals, if only for the sake of the brass buttons.

The questionnaire concerns the subject of national defense, which is something you may have heard about. Admirals who cannot read can have the questions read aloud to them by a maiden aunt or midshipman. Any admiral who cannot score at least sixty per cent on the test is disqualified as an admiral and must be put in the ship's cellar to polish the machinery.

1. What is the cost of a first-class battleship? How long will it remain a first-class battleship in peace time? How long will it remain a first-class battleship with a 1,000-pound aerial bomb down its smokestack?

2. How many fighting aircraft could we build for the price of a single battleship equipped with either a single or married admiral? Why don't we do it?

3. Who is Wilbur? Is he the man who makes the chocolate buds? Who is the Secretary of the Navy? Which was his favorite battle?

4. What's wrong with this sentence: The United States is protected on all sides by impassable oceans and a few square acres of fighting ships.

5. What steps is the Navy taking to provide that in case of war the war will be arranged to take place within range of the Navy?

6. How do you tilt a 14-inch rifle to shoot at a bombing plane over your head? What do you do if the kick of the gun pushes the ship under the water? What steps would you take if you looked out of the window and saw a fleet of enemy planes coming in from the sea? Would you take big ones?

7. How many parachute jumps at the Navy Yard constitute aerial preparedness?

8. Explain the doctrine of Faith, Hope and Parity.

9. How long is a yardstick? How many paper cruisers does it take to lick three battleships which aren't built yet? How long does it take to build a battleship? How long to sink it? How long to replace it? What is the enemy doing in the meantime?

10. Supposing you were the admiral in charge of a ten-thousand-ton cruiser costing ten million dollars, and a ten-thousand-dollar airplane dropped a thousand-pound pineapple into your powder magazine, what would you do about it? Would you write to your Congressman?

11. How do you suppose you and the other admirals snitch half a billion dollars a year from the nation for your play toys and leave the cupboard bare for the Air Forces?

12. If you are an admiral, what do you care about these things anyway?

I haven't tried this questionnaire on any admirals yet. I don't know any admirals. Maybe I don't move in the right circles to know any admirals. For that matter, I don't care much about moving in circles. For all I know, the disposition to move in circles is just what is wrong with the admirals.



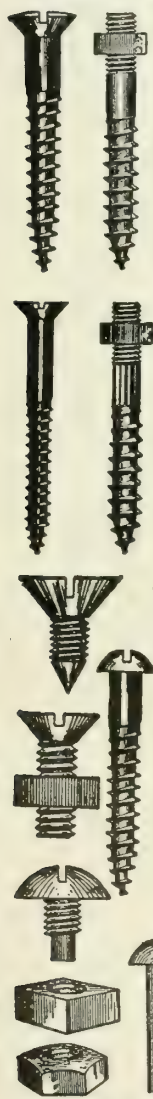
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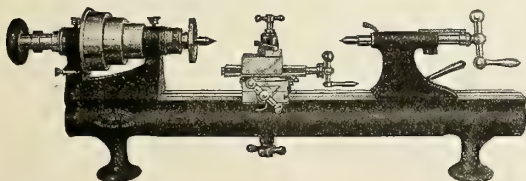
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Stark now can apply this experience to your small shafts, bolts, rollers, bushings or small assemblies which must be specially treated and accurately finished.

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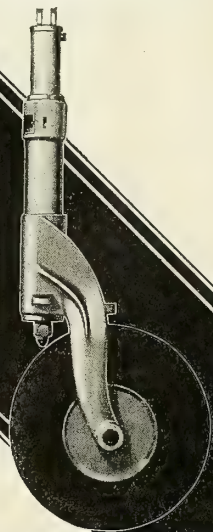
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**O**UR Cadet primary glider is ruggedly built and will stand hard service. It is simple in design which makes it so ideal for training purposes.



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AND WRITE US.

**THE BAKER McMILLEN CO.**  
AKRON, O.

Established in 1876

## AIR HOT AND OTHERWISE

(Continued from page 68)

'mechanization.'" Garvin states further that the Navy must finish with the ridiculous rule of thumb (its traditional share in all expenditures). "And the Army must recognize once for all that . . . what comes first, unless we have lost all our old commonsense, and independent spirit too, is what only Air Power can provide—home security. If the poison-war breaks out, air-invasion and promiscuous massacre of crowded populations will occur everywhere. . . . We did not fight through the World War for this shoddy sequel."

The astonishing Garvin, beyond doubt England's greatest and most influential editor at the present moment, winds up his amazing and impassioned review of the whole situation with a paragraph, beginning, "Ladies and Gentlemen of 21 and over, constituting . . . our final regime of universal suffrage . . . you spend £200 (\$1,000) a minute on armaments. Nevertheless, as regards power in that air above you all, whence poison and flame will sweep on you if peace is broken, you are a subordinate nation. . . . Is this good enough? If not, then save your millions or modernize your defence."

**W**ITH more pity than scorn, more sorrow than wrath, we once more gently touch reproachful fingers to that special typewriter which we reserve for philanthropic effort—in this case the unpaid service of trying to educate "C. G. G.," editor, nay, pilot, assistant pilot and doubtless even ground crew of *The Aeroplane*. May it never slip into a spin. We should miss it; it's so amusing.

Grey the terrible, the pitiless, the man who has discovered that in United States aviation there is nothing good, least of all refueling tests. "Dud stunts," he calls them; and when we modestly protest, reiterates with stentorian voice "DUD STUNTS."

It gets us all mixed up. Somebody is wrong. It must be the balance of the world; for, of course, it can't be Grey. Still we note with comfort the verdict of the German press, both lay and professional, that these American achievements are of "great practical value as demonstrating the feasibility of refueling in the air, which is bound to have important bearing in its application to long-distance, overland, and possibly ocean flights"; and the careful statement of America's Director of Aeronautics of the Department of Commerce, Major Clarence M. Young, that he believes the practical value of refueling, as proved only by these flights, "will have an immense effect upon long-distance commercial aviation, supplying knowledge which eventually may enable fully laden cargo planes to fly back and forth across America without stop and never burdened during the long aerial voyage with a fuel weight so great as to cut down seriously their useful load, these flights being virtually certain to result in a practical application of refueling methods to scheduled services, thus permitting not only larger loads, but lowered costs to users of air transportation."

"And some time in the near future," says a German expert, "through-transport planes, thanks to refueling, will take off from New York and not touch ground again till they have reached the coast."

Their confirmations of our judgment cheer us up. It even seems to us that if Grey does not stop them, refueled flights may carry Englishmen and heavy cargo from London to Bombay, non-stop.

(Continued on next page)





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(Continued from preceding page)

"A boon to commercial flying," F. Rechnitzer, the aviation editor of the great Scripps-Howard chain of newspapers, calls the refueling idea.

"Another great step in the advancement of aviation," Assistant Secretary of the Navy Ingalls says of it.

The United States Army report upon the engine also disagrees with C. G. G.'s conclusion that an engine might better be tested "on the block," squat in a shop, than by such methods. It regards as invaluable to engine-makers the evidence of 150 hours continuous service in the air and thinks these long refueled endurance flights have revealed hitherto unguessed needs for strengthening certain engine-parts and opportunities for saving upon others. The Wright Aeronautical Corporation, manufacturer of the Whirlwind engines used in the *Question Mark's* great test, calls the knowledge gained "invaluable," and refers to useful revelations concerning fabric, dope and so on. How shamed they all will be when someone tells them that the great C. G. G. regards the stunt as "dud" and so compels them forthwith to eat all their words which praised it.

America's air mail authorities, also, presently will find themselves entirely disapproved by C. G. G.; and that, of course, may bring our air mail to an end. They are even now preparing to try four full-cargo non-stop, and therefore necessarily refueled, mail flights from East to West across America's three-thousand-mile width to speed up our air mail. The ship is to be piloted by the same Captain Eaker who flew the *Question Mark*. Grey's greater intellect, of course, rejects operations of this type as "duds." How mortified they'll be when they discover what Grey thinks of them! And others, too, associated with them, are running awful risks of scorn voiced in *The Aeroplane*, of London. The United States Army, the United States Post Office Department, and such men as Fred B. Rentschler, president of the Aeronautical Chamber of Commerce of America, and president of United Aircraft and Transport, which controls the Pratt and Whitney Aircraft Company, are all mixed up with these transcontinental refueling flights. Under the guidance of such mistaken influences, the postal planes, it seems, will be reloaded with mail as well as refueled at various points along the route. One, of course, must be as bad as the other. Why not reload them "upon the block" as C. G. G. suggests.

To be sure many hours of postal transport will be saved by this brand-new "dud stunt"—but what is increased speed of American mail delivery to C. G. G.? For this non-stop flight of more than 3,000 miles in one direction, the mail test plane is to weigh at take-off 3 1/2 tons, as mail planes weigh when carrying 60,000 letters on the trips over our Sierras and our Rocky Mountains. Because of refueling, these planes will not be forced to land for gas between New York and San Francisco. Dud, all dud, to Mr. Gray, of course. Why not? American, not British, mail and business men will benefit.

But we must be merciful with C. G. G. The fact is that we believe he has been influenced by one of our own.

He says, for instance, that because of its youth, AERO DIGEST cannot be expected to carry the weight, either intellectually or as an advertising medium, carried by "America's oldest and still leading aeronautical journal." Something more for C. G. G. to learn. AERO DIGEST carries always more and sometimes upwards of four times as much advertising as the journal he refers to. As to

(Continued on next page)

# AERO FIRE EXTINGUISHER

PISTOL TYPE



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*Fine smothering gas, under pressure in steel capsules, propels the liquid in this new extinguisher. The resulting action is positive.*

The Aero Pistol Type Fire Extinguisher is light in weight and simple in construction. The few working parts are out of the fluid and cannot jam, stick or corrode. Metals are used that resist corrosion. The mechanism is not affected by constant exposure to varied climatic conditions. All exterior parts are cadmium plated.

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Aero Fluid contains no alkali or acids. It will not harm metals or finishes. Neither will it stain nor injure fabrics. Aero Fluid will not deteriorate or freeze. It is a non-conductor of electricity.

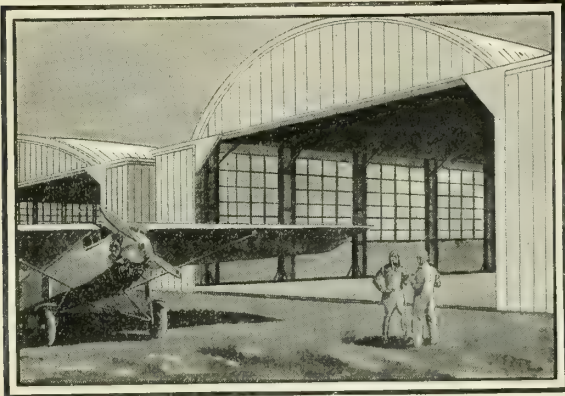
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(Continued from preceding page)

the intellectual quality of our editorial content, why—but modesty must make thumbs of all our fingers when we start to comment upon that. Still, if C. G. G., would but investigate our circulation he would find we actually have four times as much as "America's oldest." Americans buy that which they believe is the best their money can obtain.

That which ails you, C. G. G.,—but, hell and Maria (see the American ambassador, C. G. G., if that expression troubles you) there is so MUCH. Come over here again, under the right auspices and guidance.

When you came over the first time you did not see or learn about the country. It was in 1924 when you visited the States as the guest of a then aviation editor, who since has passed out of that picture in which our minds are grouped. He is in England at present and, we think, not far from you—maybe at your elbow.

If we are to assume that all of your material, C. G. G. is based on premises as shaky as that which led you to declare, in your issue of June 26, 1929:

"To talk about the astounding demonstration of the merit both of an American-designed plane and the American-built engines is also sheer bunk. The machine was designed by Mr. Anthony Fokker and his able staff, and one gathers that it was built in Holland by Mr. Stephan of the Fokker Company and his able staff."

"One gathers" wrongly, in this instance. The plane, in every detail, was built in the United States; and Fokker is now a naturalized American, which proves his sound judgment.

Poor C. G. G., you have had all this information from a source misleading. You don't understand that things move quickly on this side of the Atlantic. When you were over here—but we've grown, C. G. G., until you wouldn't know us, since those days; we have grown until you DO not know us. Our international records prove this, our daily mileage flown proves it. The number of airplanes which we manufacture daily proves it. Our import records prove it. Soon we shall be selling aircraft as Ford sells cars for foreign markets.

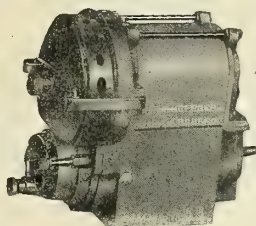
Maybe it is a prophetic mind which worries you C. G. G. Maybe you see that airplane export trade from the United States will grow, grow and grow. Maybe you're afraid of it. Is that it, C. G. G.? Well, if that's it, we'll admit you have reason for your worry. But endeavoring to belittle real American achievements will not help you. We have said you need another trip to this live country. Come on—as soon as possible. We'll give your brain a wonderful refueling with useful modern knowledge.

THE N. A. A. will be in session in Cleveland for its annual meeting when this article is off the press, and at this meeting will choose officers for the coming year. When it met in Los Angeles, last year, and elected Bingham, we thought him the right man to vitalize the dying organization. We are wrong—Bingham is no monkey-gland and the N. A. A. now, more than ever, needs rejuvenation. Although interest in aviation has been infinitely greater than in the past, the National Aeronautic Association's increase in membership has been very small. True it has multiplied the advertising revenue from its magazine, through conferences of manufacturers called by Bingham (a United States Senator acting as a solicitor for lineage being such a fascinating sight), but that has not helped national aviation.

(Continued on next page)

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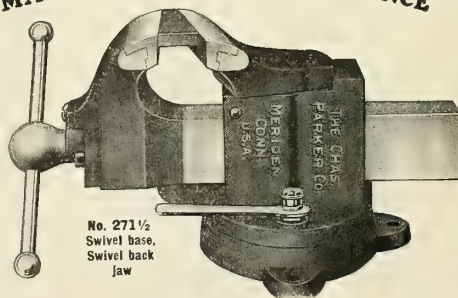
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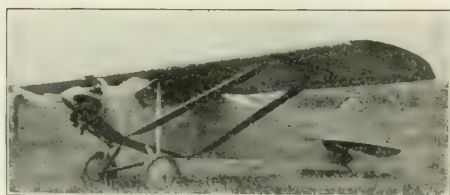
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JOLIET, ILL.

(Continued from preceding page)

While the N. A. A. has been standing virtually hitched, an organization in New York, headed by one ex-service flier has secured over 60,000 members. This group probably has not given its members much more than the N. A. A. has given its members (it scarcely could give them less), but for the cause it has done more.

Last year we recommended that the N. A. A. ought to identify with itself every flying club in the United States. The thought when thrust at the N. A. A. worked as a finger pushed in putty. It merely left a hole. It should not be forgotten if the N. A. A. ever achieves a really intelligent head. Let these clubs preserve their own identities but tie them up so that aviation will have a voting strength that will be recognized up on The Hill, in Washington.

In January it was announced that the N. A. A. had named a special committee to study the possibility of organizing private flying clubs throughout the country on a national scale in cooperation with it. But what has happened? Search us! Search Bingham. And you won't find anything which really has been accomplished.

No occasion for new clubs. Thousands already exist. They will all cooperate if given an excuse for thinking that the N. A. A. has come to life. Not all their members may be able to drink tea at 4 p. m., or mingle with the socially elect at Washington functions, but, "by crackie," they can vote and votes make the wheels go round, at the Capital.

Reduce the dues to an annual dollar (new, small bills accepted), make the slogan a million members in the next twelve months; and American aviation will have behind it an organization worthy of the name which will not specialize in small-talk, but will go to the mat and do something.

It's only a good year's job to do this and there are many men at hand capable of heading the endeavor. It should be the task of the N. A. A. to find one of them—just one of them. And do it at this year's convention.

The N. A. A. should be no tail for any individual canine. It should be the dog, himself—and, incidentally, it should and can be the very hottest dog yet offered to America's public, lots of the mustard of achievement, and always served RED HOT.

Contrast this great exhibition of pretense and small record of achievement with that which has been done by the Exchange Clubs. Although the roster of these clubs is not made up of men actively interested in aviation, their impulse in that direction is born of a patriotic urge to help the country and a practical urge to help the business of each community of the very large number now possessing Exchange Clubs. The N. A. A. is six years old and is made up of those specifically interested. The Exchange Clubs in one year have done more for national air-mindedness than the N. A. A. has done since it was born. If you don't believe it—read:

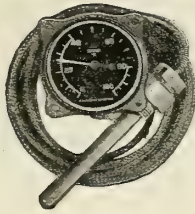
On January 29th the Exchange Clubs held a dinner in New York, at which was announced their air plans for the coming year. National Secretary Harold M. Harter sends us from Toledo advance tidings of their first annual survey of actual achievements in "establishing and equipping airports, air markers and lighted signals promoting the use of airplanes for transportation," under their "Service to Aviation Program." It takes our breath away and blows our hat off to the National Exchange Clubs.

"We are confident," writes Mr. Harter, "that you will

(Continued on next page)



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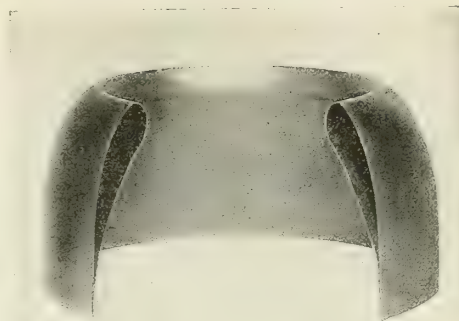
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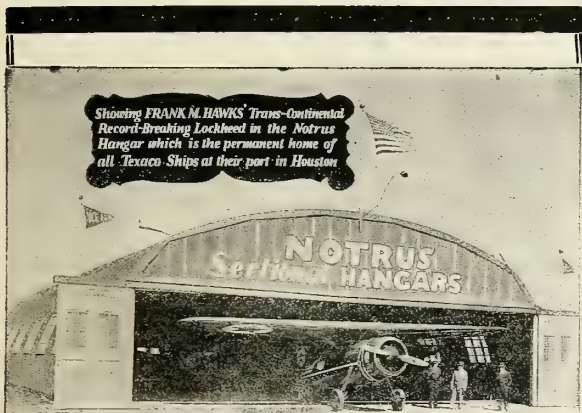
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Little mathematics has been used, and a knowledge of only elementary physics and mechanics is required. Many of the data are graphically presented in the form of curves and these are developed and explained step-by-step. There are 209 photographs and diagrams.

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### "ROOSEVELT FLIES WITH ARCH HOXSEY— ATTAINS HEIGHT OF 100 FEET"

*This is the caption of a three column article printed in the New York Sun, dated October 12, 1910, describing ex-President Roosevelt's first flight in an airplane with Pilot Arch Hoxsey.*

Posey spruce spars and ribs have been associated with some of the foremost figures and flights since aviation history began more than 25 years ago at Kitty Hawk.

When Arch Hoxsey first gained world-wide fame for his "daring flights" it was in a ship constructed of Posey spruce ribs and beams. Hoxsey was employed by Posey at that time and we financed his first dirigible with a spruce carriage.

Walter Beech's Travel Air, which won the first Ford Reliability Tour, and the Waco which placed first in the second tour, used Posey ribs and beams. Later, the ships which participated in the Dole flight to the Hawaii Islands were Posey spruce-equipped.

Lindbergh's New York to Paris Ryan; Schlee and Brock's 'Round the World Stinson; Byrd's North Pole Ford—all used Posey Spruce.

More recently . . . the Buhl "Angelus" and the Curtiss-Robertson "St. Louis Robin," record smashing endurance plane . . . were Posey users.

**POSEY MANUFACTURING COMPANY**  
**HOQUIM, WASHINGTON**

(Continued from preceding page)

be interested. The final report of the survey, which was made from detailed questionnaires sent to every Exchange Club in the United States, follows:

Total aviation achievements .....	851
Airports and equipment established .....	201
Air markers and lighted signals .....	223
Air mail and promotional events .....	217
Aviation projects planned .....	210

"The climax of our year of Service to Aviation is to be our sponsorship of the National Women's Air Derby, from Santa Monica, Calif., to Cleveland, August 18 to 26, in connection with the National Air Races. Like the other features of our Aviation Program, it is not being commercialized by this organization in any manner.

"All the Exchange Clubs are enthusiastic over the Aviation Program and we are looking forward to even greater developments during the coming year."

Such work is worthwhile.

## EFFECTIVE SALES METHODS

(Continued from page 65)

of a plane is still worth news items in the local newspaper. The salesman who travels by air is still enough of a novelty to attract the attention of almost any person with whom he desires to do business. In many instances firms have found that, by wiring ahead that the salesman would arrive at the airport at a certain time, the customer would meet him at the field, whereas it would probably have been hard even to obtain an interview if he had traveled by ordinary means.

With many high salaried sales representatives, a few days saving in time greatly overbalances the cost of the plane's operation. The time saved by business executives is even more important. The efficient executive keeps in close touch with all branch offices and factories of his company by making periodic inspection trips. The time saved by using airplanes for these trips sometimes amounts to many days a month.

For example, J. H. McDuffee, vice president and general manager of the Prest-O-Lite Storage Battery Company of Indianapolis, formerly spent about two weeks out of every month in travel to contact his various distributing agencies. He recently purchased a new Ryan Brougham which he had equipped with an office desk, filing equipment, dictaphone, and other accessories similar to those in his home office. By the use of the plane he has been able to save about a week out of every month; and in addition, he is able to reach many more places and attend more meetings than he could when he depended entirely on railroad or automobile travel. At each point he takes his distributors for a flight, and thus they receive the impression that the home office is on its toes to use every modern means in developing business.

Representative of the various business firms which are operating Ryans are the following: The Standard Oil Company of Ohio; the Standard Roofing Company; the Cleveland Pneumatic Tool Company; the Wolf Car Company; Earl W. Baker & Company; the Midland Oil Company; the Arch Haynes Drilling Company; the Prest-O-Lite Storage Battery Company; Lane, Piper & Jeffery, insurance company; and Charles L. Morgan, attorney.

A knowledge of all such companies which have found airplane use profitable enables the airplane salesman to give helpful ideas to his business prospects.

(Continued on next page)

## HOLCKER ALUMINUM TANKS

Among users of HOLCKER Aluminum TANKS are found the leading aircraft manufacturers . . . .

Because, HOLCKER Aluminum TANKS are made to your specifications by an organization of experts, in a plant noted for fine workmanship for more than a quarter of a century.

### Send In Your Blue-Prints For Estimate

If you will send in blue-prints of your tanks (wing or fuselage), we will, at no obligation to you, furnish complete estimates and guaranteed delivery dates.

## HOLCKER MANUFACTURING CO.

Holcker Building,

Kansas City, Missouri

## THESE FAMOUS FLYERS ALL WEAR AND STAND BACK OF

*Gordon*  
**AEROTOGS**



Lieut. Leonard S. Flo has so much faith in Aerotogs that he wore them on his non-stop flight from Canada to Key West, Fla.



Mr. W. A. Mara, Sec. of the Stinson Aircraft Corp., says that Aerotogs are remarkable for their service and comfort.



Commander R. E. Byrd and his flying crew are now wearing Aerotogs at the South Pole.



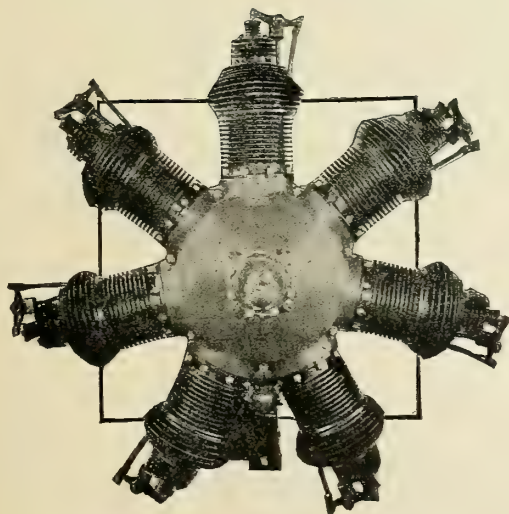
C. W. (Speed) Holman has made aviation history. On long distance flights and consecutive looping tests he wears Aerotogs.



Miss Gene La Vock is a daring stunt flyer. She recommends Aerotogs to all persons associated actively in the art of aviation.

Regardless of the conditions under which you fly, there are Gordon Aerotogs to suit your needs. The Aerotogs line is complete from Helmet to boots. If your dealer cannot supply you, write to us today.

GORDON & FERGUSON, Inc., St. Paul, Minn.



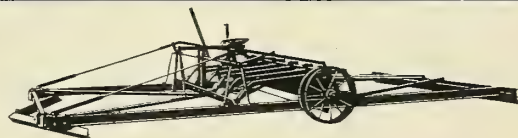
### THE BEETLE

For reaching vision, extensive experience and exhaustive tests, based on a full understanding of the problems of the air, have developed in THE BEETLE an engine which, in its class, knows no peer. Exceptional power, sparkling speed, instant response and a smoothness of operation have been coordinated to make THE BEETLE what it is—

A GREAT ENGINE

THE KIMBALL AIRCRAFT CORPORATION  
Naugatuck Conn.

## Automatic Machine for Leveling and Maintaining Airports



### New Machine

Saves Time, Labor ~ Produces Smooth Surface

THE Eversman Land Leveler is so constructed that the blade automatically cuts off the high places and releases dirt to fill in low ones. Smooths and levels as it goes. Saves investing in expensive equipment for leveling purposes—also saves because it is operated by one man on tractor and levels a ten-foot strip at a time. Maintenance managers say it is cutting leveling and field maintenance costs in half. Unsurpassed for leveling ground prior to sodding, oiling or paving. Economical to buy. Fully guaranteed. Write for FREE booklet giving full details about this new automatic machine—showing it in actual operation and the results obtained on many well known airports.

The Eversman Mfg Co., Inc.

241 So. Cherokee

Denver, Colo.

Blade suspended on movable sub frame, connected with wheels by eccentric axle, making action automatic as machine goes over undulations of soil.

GENTLEMEN:  
Please send your free booklet giving full details on New Automatic Land Leveler.

Name .....  
Address .....



# JAEGER



Time of Flight Watch 8 Day

IN Airplane timepieces, Jaeger instruments lead the field. These accurate precision made Swiss-American watches are the first choice of the foremost European and American flyers. 8 Day Timepieces with or without Chronograph (Stopwatch) or Time of Flight features. These models mount flush on the panel and have front wind and set. Radium treated dials if desired.

JAEGER WATCH COMPANY  
S. A. U. S. A. S. W. I. T. Z.

304 East 45th St., New York City  
Geneva, Switzerland

Paris

## AERONAUTICAL TIMEPIECES



**Is your internal  
wing and fuselage  
bracing twisted?**

**You can know if you  
brace with the Hartshorn  
Square Section Tie Rods,  
for the flat faces make  
any torsional strain im-  
mediately visible through-  
out the length of the rod.**

STEWART HARTSHORN CO.  
250 Fifth Ave., New York City

*Hartshorn*  
Est. 1860

**AIR CRAFT  
TIE RODS**

VISIT OUR BOOTH 179 AT NATIONAL AIR RACES

(Continued from preceding page)

Our dealers and distributors have found that almost every company gives careful consideration to the purchase of a plane when the matter is properly broached and substantiated with accurate figures on total operation costs and on the results which companies in similar lines of business have obtained by owning planes.

This market is one which is rapidly assuming greater proportions, particularly for the medium size cabin plane. It is, however, a market that requires specialized knowledge if it is to be worked satisfactorily. It is one which offers a splendid opportunity for automobile dealers and other sales organizations with a thorough knowledge of sales conditions and methods.

The ideal salesman is of course a man who not only can pilot a ship but also can approach with equal ease and effectiveness presidents of large corporations, commercial operating companies, and wealthy sportsmen. But such men are exceedingly rare. For that reason the dealer often does only the sales and preliminary educational work, and leaves actual demonstrations to the distributor who has good pilots available. Thus useless demonstrations are eliminated.

The airplane salesman, particularly in the business field, usually has to convince his prospect first of the value of air transportation and then of the merits of the particular plane he is handling. Whenever possible, our salesmen place a plane at the disposal of a prospect for several days, taking him on an extended business or pleasure trip, showing him the availability of airports and servicing facilities, and proving under actual operating conditions the reliability of the plane and its adaptability to his purpose. When a business man finds by experience that he can do business in Detroit, Chicago, Indianapolis and St. Louis in a single day, he recognizes almost immediately the advantages of air transportation. And sales usually follow.

Because the dealer's knowledge of his territory is invaluable in making airplane sales, distributors are willing to make very liberal arrangements with him to handle a city or group of counties. The dealer's commissions usually range from 5 per cent up to 20 per cent, depending on how intensively he is working the territory and his influence in making sales. To avoid dispute, these commissions are usually governed by definite contracts. If the dealer maintains a demonstration plane and contracts for a certain number of ships per year, he receives the higher commissions; whereas, if he is merely working the airplane sales as a side line, he receives the smaller commission.

Despite the fact that we have an unusually live and active distributing organization, a large part of the burden of sales falls upon the factory office and our factory sales representatives. In nearly all sections of the country we have direct factory sales representatives each having a plane and pilot at his disposal. These men help the dealers and distributors in making demonstrations and do direct sales work where the territory is not covered thoroughly. Inasmuch as we believe that it is essential to give the distributors every possible help in building up their organizations, they receive full commission on all sales made by these men in their territory.

The factory representatives also aid in establishing dealers and in keeping the sales organizations informed as to methods which have brought success elsewhere.

We encourage the dealer to handle a full non-competitive line of ships, not requiring him to sell the Ryan alone. With a complete line, the dealer or distributor is better able to put full-time salesmen into the field and can sell

(Continued on next page)

## ANOTHER AIRPORT CHOOSES ESLINE



If experience counts—ESLINE should be YOUR CHOICE. 20 years of steel building experience coupled with a thorough knowledge of airport requirements makes Eslin the best Hangar.

Note the sturdiness of construction shown in the picture of the new Eslin Steel Hangar erected for the Lorain Airways, Inc., Lorain, Ohio.

Scores of others will testify as to the many advantages of Eslin Hangars.

### ESLINE ADVANTAGES

1. Fire, Lightning and Weather Proof.
2. Low First Cost and Maintenance.
3. Lowest Insurance.
4. Easily enlarged, dismantled or removed.
5. Backed by 20 years of Steel Building Experience.

Write for our dealers proposition and complete airport and hangar data.

**ESLINE CO.**

Dept. D

Oconomowoc, Wisconsin

ESLINE CO., Dept. D

Oconomowoc, Wis.

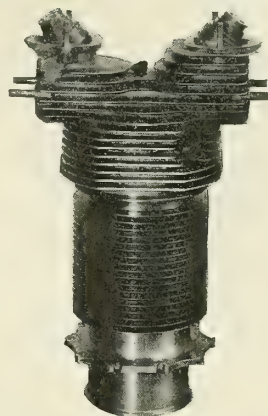
Please send complete data and prices on Hangar, approximate size.....

Name .....

Address .....

## AIRCRAFT ENGINES PARTS

To Manufacturers' Specifications



**GOVRO-NELSON CO.**

1931 Antoinette

Detroit

Michigan

## Remarkable!

In dignified beauty within and without—in luxurious comfort—THE DRAKE rightfully takes its place among the great hotels. In location it surpasses them all. Here the sun-swept waves of blue Lake Michigan invite your gaze; yet a few minutes' exhilarating walk and you are in the midst of the sights and sounds and surging movement of Chicago's world-famous Loop.

Rates as low as \$5.00 a day single room with bath; \$6.00 double. The ideal year 'round home—special discounts for extended stays. Write for Illustrated Booklet, Edition 15

*Under the Blackstone management  
the world's standard in hotel service*



## "THE EMPIRE" HELMET

*Used by  
Famous  
Pilots  
Everywhere*



Empire Helmets are strongly made for service. They are tailored in a variety of leathers and of durable cloth materials—neatly lined. Made in individual cap sizes—easy to fit!

Empire Helmets are backed by our 22 years of experience in cap manufacture. If your dealer can't supply you, write us.

### DEALER PRICES

#### Genuine Calf Leather (Black or Brown)

Chamois Leather Lined, Doz. ....\$21.00  
Wool Lined, Doz. ....\$18.00

#### Durable Cloth Helmets

White or Tan Herringbone Cloth, Doz. ....\$ 9.00  
White, Tan or Gray Gaberdine, Doz. ....\$10.50

You will find this popular-priced helmet a profitable seller.  
Order an assortment today!

**Empire Cap Mfg. Company**  
908 Broadway, Kansas City, Mo.



## COLONIAL GRAIN UPHOLSTERY LEATHER

made by

**EAGLE-OTTAWA LEATHER COMPANY**

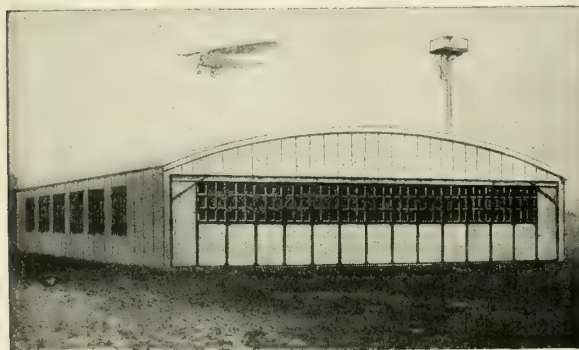
Grand Haven, Mich.

Genuine leather for airplanes is  
**NON-INFLAMMABLE, durable  
and clean. It is sound-deadening  
and vibration-absorbing.**

*Sample books furnished on  
application.*

**CHICAGO, ILL.      NEW YORK CITY**  
912 W. Washington Blvd.      74 Gold St.

**ST. LOUIS, MO.      SAN FRANCISCO, CAL.**  
1600 Locust St.      569 Howard St.  
**PORTLAND, ORE., 474 Glisan St.**



## EDWARDS INDIVIDUAL ALL-STEEL HANGARS

**FIRE PROOF      LIGHTNING PROOF  
EASILY ERECTED  
STEEL BUILDINGS FOR EVERY PURPOSE**

**THE EDWARDS MANUFACTURING CO.**

345-395 Eggleston Avenue, Cincinnati, Ohio

*(Continued from preceding page)*

each prospect the type of plane best suited to his needs. A large business corporation would seldom find a small open-cockpit ship suitable; on the other hand, the individual who uses a plane purely for sport would seldom be justified in purchasing a large cabin plane.

Although we usually do not hold distributors and dealers to their agreed quota of planes, contracts are not renewed at their expiration unless the sales organizations have shown results during the year.

We regard factory advertising and constant publicity as an invaluable aid to sales. We are, at the present time, advertising in sixteen magazines of national circulation, and are putting more and more money in the general magazines that reach business executives and wealthy individuals.

From our advertising we receive a constant stream of inquiries from corporations and individuals who are interested in purchasing cabin planes. These inquiries are given attention at the factory and are then turned over to the distributors and dealers for personal follow-up. The dealer determines whether the prospect is seriously interested and whether a demonstration is worth while. The factory sales representative checks these inquiries on his trips and reaches those with which the dealers and distributors have not been able to establish contact. A careful record of each prospect is kept at the factory, follow-up sales letters being sent at intervals and personal calls made at the proper time. The distributors also do sectional advertising, and the dealers occasionally, local advertising.

In addition the factory periodically undertakes direct mail campaigns, designed to reach a particular class, such as oil companies, newspapers, machinery manufacturing companies, and wealthy sportsmen. These letters and booklets outline the experience of people in similar lines of business and present detailed plans showing how an airplane may be made to pay for itself. These mailings also result in a large number of inquiries which often result in sales. Printed matter describing airplanes, particularly when it outlines a possible use in the prospect's own business, is still unusual enough to get to the interested executive's desk.

The number of organizations entering the airplane sales field is growing rapidly. Profits greater than in any other line of commercial operations are being made by sales organizations which have started to work their territory intensively. Active, reliable distributors and dealers are now available in every section. The result is that territories are being reduced to allow more intensive working.

The potential popular and business market, I believe, will form a rapidly increasing proportion of sales for the smaller open-cockpit and cabin planes, and it is in this field new organizations can profitably enter with very little investment.

### SHOOTING WITH FOUR LENSES


*(Continued from page 80)*

not work because its oil became too thick.

There were minor adventures for the army flier, even over the Ohio River Valley. Lieutenant Taylor successfully made one hazardous take-off from a cow pasture after ripping through several fences. And over the mountains the officer and his aide had to have complete confidence in the Douglas and their parachutes, for there are no emergency landing places.

Between hops, the officer indulged himself in trigonometry with Kentucky's pictures in his laboratory.


"But it suits me better to be over Kentucky at 12,000 feet," he said. "Just keep me up in the air."



# FLEXIBLE STEEL WIRE SHAFTS

*for power transmission  
around corners and over  
obstacles — silent, steady  
durable, strong.*

**The S.S.White Dental Mfg. Co.**  
*Industrial Division*  
152 West 42nd St. New York, N.Y.




**S.S. WHITE  
FLEXIBLE  
SHAFTS**

*Handbook  
for  
Engineers*

The S.S. WHITE  
DENTAL MFG. CO.

Write for this book  
Sent free on request



## CYLINDERS MACHINED

*Ready  
for Assembly*

During our twenty-five years' experience in making air-cooled cylinders, we have developed not only an advanced foundry and metallurgical technique for handling difficult shapes and peculiar alloys, but we have also added modern pattern and machine shop facilities.

These added facilities enable us to furnish complete cylinders, machined ready for assembly, direct from your blue prints.

We shall be pleased to quote on castings only, on patterns and castings, or on machined cylinders.



  
**S. Cheney and Son**  
MANLIUS, N.Y.

## NEW HADDON HALL IS READY

Old in hostship, new in luxurious rooms and appointments, Haddon Hall is ready. Its sleeping-rooms, dining-rooms, sports-rooms, sun-rooms, "Sandy Cove," a playroom where the children are safe and happy, its beautiful lounging-rooms—all these are ready, down to the last softly shaded light and the tiniest children's toy.

And the old friendly spirit that has long made Chalfonte-Haddon Hall famous still prevails.

With the ocean almost at the doors—wouldn't a few days' visit do you good? Write for literature and rates. Motoramp garage adjoins the hotel.

## CHALFONTE-HADDON HALL

ATLANTIC CITY

American and European Plans  
*Leeds and Lippincott Company*

## GOVERNMENT APPROVED SCHOOL

We have a few vacancies for those who desire the better kind of instruction.

**50-hour Limited Commercial Course**

**20-hour Private Pilot Course**

**Ground Courses Included**

**The best and most completely equipped airport in the country and rating as an approved type school by the U. S. Dept. of Commerce.**



**D. W. FLYING SERVICE, Inc. LEROY, N. Y.**  
R. Holderman, Mgr.

### FILL OUT AND MAIL

Gentlemen: Kindly send me information concerning your school and flying courses.

Name .....

Address .....





## Warm and Comfortable High in a Cold Winter Sky

There's cold flying straight ahead. Now's the time to secure dependable warmth and comfort in your flying togs. SNAPPY SNUG flying clothes and helmets—finest quality and workmanship—the preference on many of the renowned distance altitude flights—used by more army and navy pilots than any other brand. Write for Catalogue B.

See our exhibit at the Cleveland Show



## CANVAS-LEATHER SPECIALTY CO.

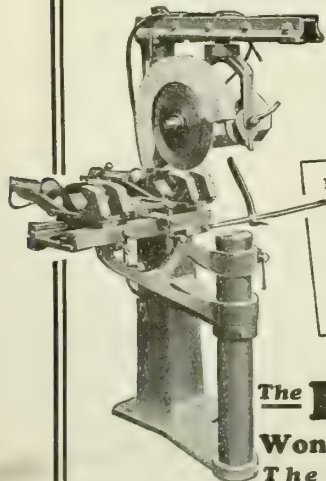
South Broad & Dye Streets

Trenton, New Jersey

### —for speed, power, accuracy and time economy in metal cutting

Speeding up production, maintaining accuracy and cutting down costs are DeWalt's contribution to the airplane industry. For the DeWalt Wonder Worker is now used by 80% of the industry for cutting Chrome Molybdenum steel tubing, flat stock and other metals.

Send in the coupon for full information about DeWalt performance in the manufacturing of airplanes.



The DeWalt may also be quickly adapted for various kinds of woodworking.

DeWalt Products Corp.  
721 New Holland Ave.  
Leola, Pa.  
Tell me how the DeWalt  
cuts costs.  
Your Name .....  
Firm Name .....  
Address .....

**The DEWALT**  
**Wonder Metal Worker**  
**The Economy Worker**

## UNDERGROUND HANGAR ARRANGEMENTS

(Continued from page 96)

plane. In less than five minutes after a mail plane has touched the landing field, its mail will have arrived at the central postoffice. Mail clerks will assort mail in flight in much the same manner as railway mail clerks assort mail aboard a fast moving train. Air mail shot through pneumatic tubes to office buildings would arrive at its final destination and be read about ten minutes after the plane has landed.

Another feature which has not been mentioned, but which would be of vital importance in expediting incoming and outgoing planes, is the through service available in this conical shaped airport. A plane arriving would enter the station, discharge its passengers, and if the next hop were a short one not requiring the plane to be serviced, would move straight ahead to the opposite side of the hangar, where it would take on its passengers and run down the incline to take off. There would be no turning around or taxiing from one end of the field to the other to get set in a head-on wind position. By simply continuing in the same direction he landed, the pilot would be all set to take off.

## FLYING IN THE LAND OF THE INCAS

(Continued from page 60)

is a Maltese cross surmounted on a laurel wreath, with the four points made in the form of double wings. It has a round center composed of the Sun of the Republic of Peru. The ribbon is green, with three narrow black bands in the center. The cross is of two classes, first and second, the first class being of gold to be awarded only for major achievements, and the second being of silver, to be awarded for feats which do not merit the presentation of the first class decoration. Neither class carries any monetary remuneration whatsoever.

A Reserve Corps of the army has also been organized.

Peru, in the course of another twelve months, will be among the foremost republics in South America as regards commercial aviation, a prediction which, according to present statistics, does not seem in any way unjustified.

Because of the extensive traffic on the Iquitos-San Ramon airline, the number of planes in this service has lately been increased. Emergency landing fields and radio stations are being constructed along the airway.

Ancón is at present directed by Commander B. Wyatt, late of the staff of the Commander-in-Chief of the U. S. Navy. The Las Palmas school is under the supervision of Colonel Melgar. The staff of the interior flying units is divided into two divisions, known as the 1st and 2nd Reconnaissance Squadrons. Of these two squadrons, Lieutenant G. Cornego Portugal is the commandant, with Lieutenant Jose Estremadoyro and Ensigns Lecca and Barrera of the Reserve Corps as 1st Division pilots. The whole unit is stationed at Iquitos. The pilots of the 2nd Division, with headquarters at San Ramon, are Lieutenant Alvarino, Lieutenant Carleton (from the States), and Ensign Pedro Greva. The pilots of 1st Division fly the seaplanes from Iquitos as far south as Masisea, where the mails and passengers are handed over to the pilots of the San Ramon landplanes.

In relation to future projects, it is proposed, in addition

(Continued on next page)



BE  
CURIOUS  
it's NEW!!



MADE RIGHT  
IN U.S.A.

Meets U.S. ARMY  
Specifications

**MAJOR**  
CHROMIUM PLATED  
Stronger, Better Bridge  
Lenses fit Right  
Priced from \$10.  
One of the 24 Styles for Aviation.

MADE BY  
**STRAUSS & BUEGELEISEN**  
BROOKLYN, N.Y., U.S.A.

## LA ROE AIRWAYS, INC.

Announce the opening of their new field

### LA ROE AIRPORT

at Bedford, N. Y.—30 miles due north of  
Roosevelt Field—in Westchester County


### STUDENT INSTRUCTION

With living accommodations for students on the field

Eaglerock Planes

Esline Hangars

220 WEST 42nd STREET  
NEW YORK CITY, N. Y.



**VELLUMOID**  
SHEET PACKING and GASKETS  
for the Oil, Gasoline and Water Connections

The choice of  
Vellumoid by  
leading air-  
craft manu-  
facturers is  
the result  
of long ac-  
quaintance  
with it as a  
perform-  
ance pro-  
duct.

THE  
VELLUMOID  
COMPANY  
Worcester, Mass.

## WELDWOOD AIRCRAFT PLYWOOD

CONFORMS to  
Army and Navy  
specifications.

USED by  
most of the larger air-  
craft manufacturers.

OBTAINABLE from  
stock at convenient  
distributing points  
in 1/32", 1/24", 1/16",  
and all other regu-  
lation thicknesses.

Prices on WELDWOOD are in conformity  
with production requirements of the air-  
craft industry.

We also carry Commercial Aircraft  
Plywood particularly adaptable in  
the construction of floors, seats, etc.

**UNITED STATES PLYWOOD COMPANY, Inc.**

The largest plywood stocks in the world

603 West 36th Street

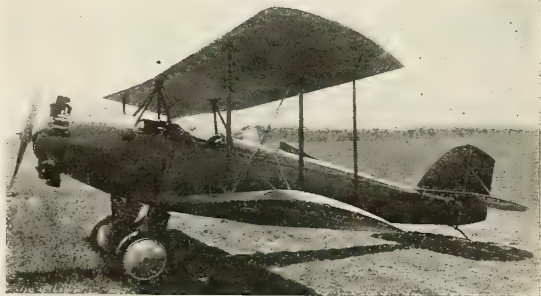
New York

Warehouses at New York, Detroit, Philadelphia,  
Boston, Rochester, Jamestown



Flies Like a Hawk - Lands Like a Kitten

## ANNOUNCING A NEW MODEL



THE KINNER POWERED KITTY HAWK

3-PLACE OPEN BIPLANE

APPROVED TYPE CERTIFICATE 166

**Bourdon Aircraft Corporation**  
Hills Grove, Rhode Island



## B. G. MICA AVIATION SPARK PLUGS



have done their part in almost all of this year's records and outstanding flights in America and you can buy plugs of identical quality for your motor from:

Pacific Scientific Co., 639 So. San Pedro St., Los Angeles, Calif., and 15 Spear St., San Francisco, Calif.

Ericson Aircraft, Ltd., 45 Jarvis St., Toronto, 2, Canada.

Air Associates, Garden City, N. Y., and 5300 W. 63rd St., Chicago, Ill.

Bloxham Aero. Supply Co., 3011 So. Wabash Ave., Chicago, Ill.

John S. Cox & Son, 222 South 7th St., Terre Haute, Indiana.

Hinkelman & Tyler, 320 E. 4th St., Davenport, Iowa.

Motor Equip. Co., Wichita, Kansas, and all branches.

Ludington Aircraft, Inc., Paschall Post Office, Philadelphia, Pa.

Pittsburgh Auto Equipment Co., 5808 Baum Blvd., Pittsburgh, Pa.

A. & A. Specialties Co., 111 Pattie Ave., Wichita, Kansas.

E. A. Bowman, Inc., 5115 John E St., Detroit, Mich.

Bredow-Hilliard Automotive Corp., 604 Broadway, Kansas City, Mo.

Nicholas-Beazley Airplane Co., Marshall, Mo.

Robertson Aircraft Corp., Anglum, Mo.

Embry-Riddle Co., Lunken Airport, Cincinnati, O.

Logan Aviation Co., 716 W. Superior St., Cleveland, Ohio.

Magneto Ignition Corp., 304 E. 2nd St., Tulsa, Okla.

Southern Aeronautical Service, Fort Worth and San Antonio, Texas.

### THE B. G. CORP.

136 W. 52nd St.

New York City

(Continued from preceding page)

to the other services already mentioned, to inaugurate an airline carrying passengers and mails from Iquitos to the Brazilian frontier, where the Peruvian machines will connect with a Brazilian aerial mail and passenger carrying service, thus cutting down to a minimum the long journey along the Amazon from Iquitos to the Atlantic coast.

### SOARING FLIGHTS AT CAPE COD

(Continued from page 67)

not a place for beginners.

The AMAC expects to build a hangar at Corn Hill for storing a few soaring planes. Qualified students will be allowed to fly from there. Preliminary student soaring will have to be done from the Atlantic Ocean side by the school buildings. At present the *Professor* has to be hauled across the Cape on a truck or trailer when wind conditions indicate good soaring on the other side. The *Professor* can be taken apart in a half hour or less. But the Prueffling student soaring planes cannot be disassembled so readily and hence cannot be hauled back and forth.

I believe another year will see a soaring school in the South, perhaps near famous Kitty Hawk in Carolina; one in California; one in the state of Washington; and one in the Middle West. Last year on a flight to Minnesota, I recall a lot of sand dunes with sand blown clear inshore along Lake Michigan's southern bounds. A school in that section would be most beneficial.

For soaring, the real need is for mountains or high sand dunes by water where there are plenty of good strong winds blowing onto the shore. And without soaring, the American sail-plane sport and business will be like the young lady who was all dressed up but had no place to go.

### FLYING FROM SACRAMENTO TO RENO

(Continued from page 71)

cabin provided heat which makes it possible to ride over the high mountains in perfect comfort.

A rock-jutted mountain, towering above our plane, passed by our right wing. Suddenly the space between the plane and the ground increased from a scant 500 feet to over 2,000 feet. Almost without realizing it, we were looking down into the blue-purple waters of Donner Lake, the peerless gem of the Sierras. Set in a deep depression and watched over by great peaks, the lake appeared as though it were a huge emerald sending out its sparkling reflections.

It was on the frozen shores of this lake that the ill-fated Donner party perished in the winter of 1847. The

(Continued on next page)

## AMAC CAPE COD GLIDER SCHOOL

Sail-plane gliding and soaring taught by German experts on the world's best sail-planes, near South Wellfleet, Massachusetts. Courses now open. Ages from 14 years up. Course \$150.

Exclusive U. S. representatives of the Rhoen-Rossitten Gesellschaft. Regional soaring centers being developed throughout America. Cooperation with sail-plane clubs and societies. Manufacturing program to be announced.

Endorsed by leading aviation authorities. President of AMAC, Major General John F. O'Ryan. General Manager, Vergne Chappelle. Directors include William G. Beckers, William Mayo, Sherman Fairchild, Cecil P. Stewart, George R. Hahn, Malcolm R. White, C. K. Froehlich, C. C. Conway, H. Grathwohl, C. E. Doll, H. F. Cuntz.

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AMERICAN MOTORLESS AVIATION  
CORPORATION, 7 EAST 42ND STREET, NEW YORK

## ON GUARD!

Between You  
and High Costs

### KESTER SOLDER COMPANY

Formerly Chicago Solder Company—Established 1896  
4253 Wrightwood Avenue, Chicago, Ill., U. S. A.

## KESTER SOLDER

FLUX-CORE

# PLYWOOD

FOR

**Airplane Construction**  
**U. S. Army and Navy**  
**Specifications Grade A**  
ANY SIZE UP TO 16' 0" x 6' 4"

## New Jersey Veneer Co.

Paterson, N. J., U. S. A.

Cable Address

Veneer, Paterson

## PITCAIRN AIRCRAFT



For Air Mail use , , , , SUPER MAILING

For Sport or Private use , , SPORT MAILING

**PITCAIRN AIRCRAFT, Inc.**

Bryn Athyn

Penna.

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(Continued from page 75)

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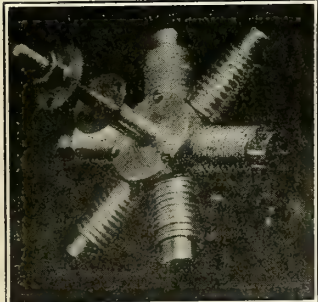

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## THE WHEREFORE OF WAR

(Continued from page 61)

of losing and winning will be more finely drawn, and the necessity of tipping the board will be more crying. That will be an immediate result of our Air Age, and we must face it.

It may be that someday we shall smash this machine of commerce that enslaves us. It is our privilege, for we have made it. It may be that a few centuries once again will find us each with a garden, a pig, a sheep, a hen and a spinning wheel in place of our present-day canned vegetables, cold storage meats and custom tailors. It may also be that the instrument to bring this dispersal of cities and unity of labor about will be a greater war than the world can conceive of at present.

Those things, perhaps fortunately, we are not given to know. We go on speaking of progress and pointing to the toys we have made to render life faster, easier and less laborious, but whether or not these things are vital to man's existence no one can say. Certainly life went on quite well before them, and it is reasonable to suppose that it will go on after they are forgotten.

Today is at hand for the living, and we must live it in our own time. It is the era of commerce and as long as it is so we must be slaves to its laws. Those laws at intervals will always force wars upon us. Times will come sooner or later when nations will be forced to the financial wall by competitor nations, just as firms and corporations are forced to the wall. When such a time threatens, war is the only substitute for an International Bankruptcy Court.

That great wars will probably never again be profitable business undertakings in themselves, and that the cost of victory is bankruptcy, does not alter the fact that after a war a new commercial deal takes place—with a new chance for everybody.

Perhaps just that necessity, at regular intervals, is the primary economic cause for war. It sounds most fiendishly logical. Let us consider such a war as if it were upon us today.

(To be continued)

## UNDERWRITING AVIATION INSURANCE

(Continued from page 87)

Almost every air meet nowadays is fully protected by liability and property damage insurance, and the operators of aircraft can secure any reasonable limits to protect them against suits for damages arising from injuries to passengers or the public in general, and against claims for damage to property of others, caused by the operation of aircraft.

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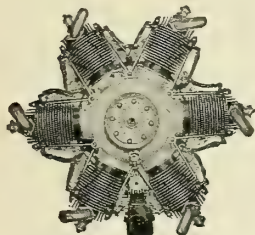
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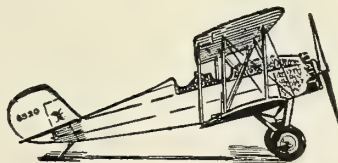
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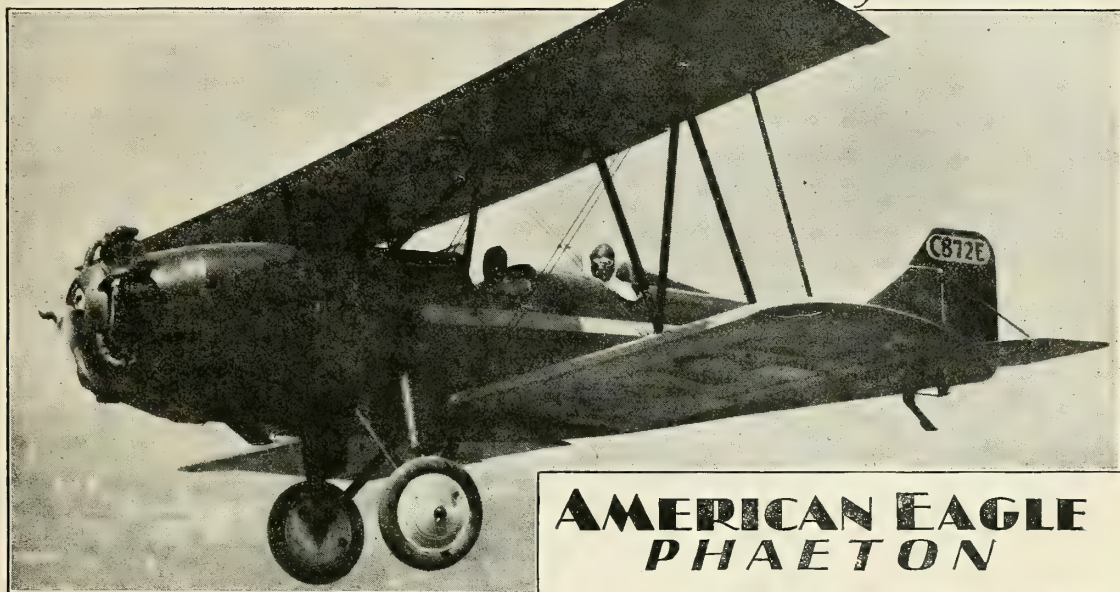
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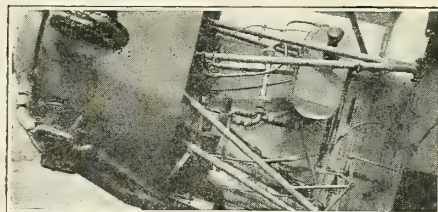
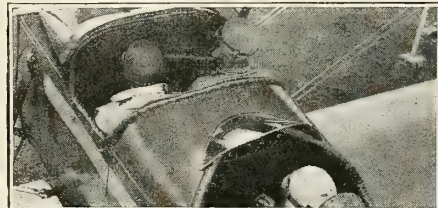


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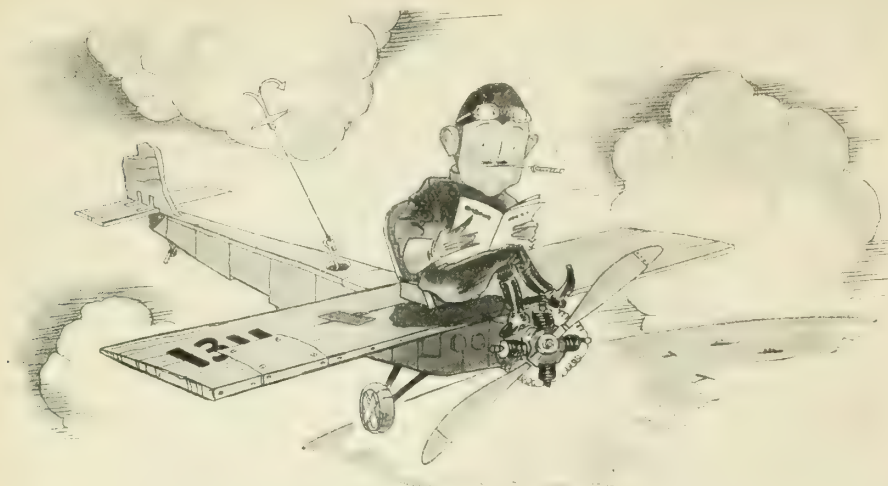
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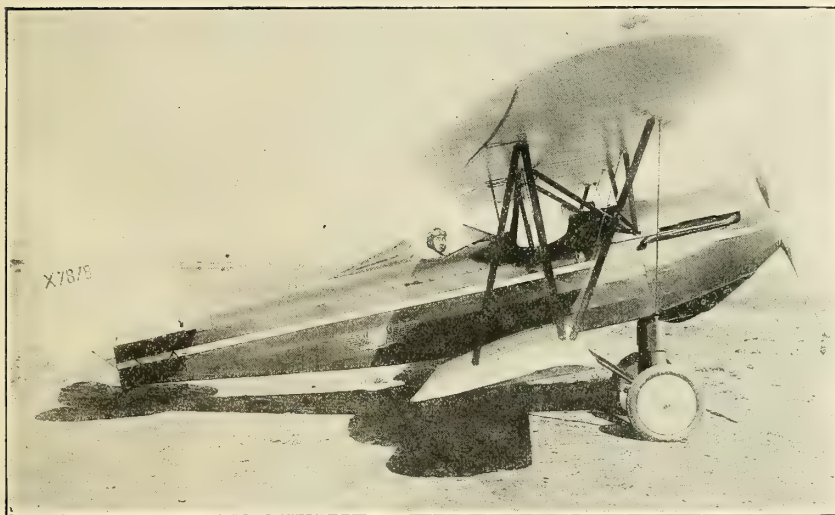
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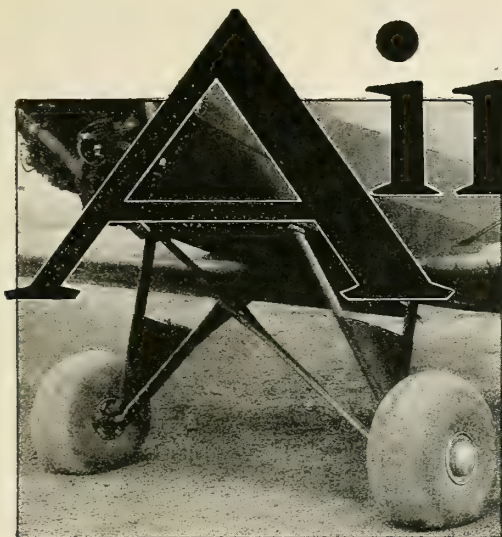
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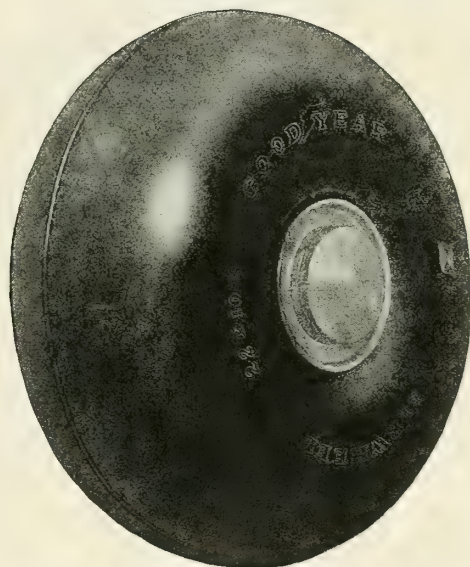
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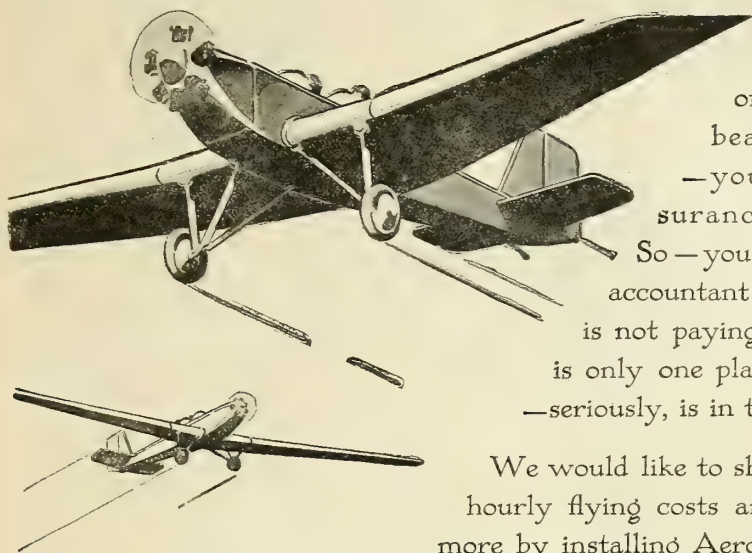
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YOUR instruction charges are based on so many hours of student flight. Each hour must bear its ratio of fixed charges—your rent, taxes, payroll, insurance, and many other items. So—you don't need a certified public accountant to tell you that if your school is not paying the profit it should—there is only one place for the leak—and that—seriously, is in the air.

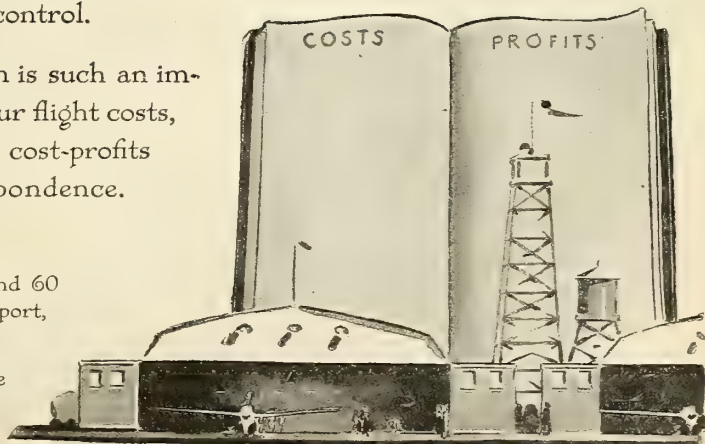
We would like to show you how average hourly flying costs are reduced 30% or more by installing Aeromarine planes as standard equipment. Their economy extends to operation, minimum of maintenance, ground handling and hangar space.

The AKL-25 is the ideal light plane for training and for sport. Powered by the famous, dependable Salmson 40 horsepower, nine-cylinder radial,—or by the equally well known, sturdy LeBlond 60 horsepower, five-cylinder, radial engine (\*)  
... these planes are built to stand rough handling and to win friends for your school by their ease of control.

Since economy of operation is such an important factor in reducing your flight costs, we would like to take up your cost-profits problem with you by correspondence. Write us today.

(\*) The AKL-60, powered by the LeBlond 60 h. p. engine, sells for \$3500, flyaway, Keyport, N.J.

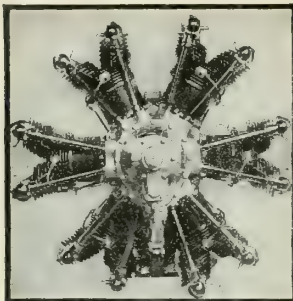
Equipped with pontoons and powered by the LeBlond engine, the AKL-60 sells for \$4500, flyaway, Keyport, N.J.



## AEROMARINE KLEMM CORPORATION

PARAMOUNT BLDG. · 44th STREET AND BROADWAY · NEW YORK CITY





"Lack of Carbon in Cylinders"  
 "Good Compression in Engine"  
 "Rings Good for Many Hundred Hours"  
 "Same Brake Horse Power as New Engine"

—Arthur Nutt  
 Designer of Curtiss Challenger



# AFTER 420 HOURS

USING 3,500 GALLONS OF GAS AND 158 GALLONS OF OIL

CURTISS AEROPLANE & MOTOR COMPANY, INC.  
 74 KAIL STREET  
 BUFFALO, N. Y. August 17, 1929

Albert W. Wenzel, President,  
 S. Hammered Piston Ring Co.,  
 Paterson, N. J.

Subject -- St. Louis Robin.  
Piston Rings in Challenger Engine.

Dear Mr. Wenzel:-

We have now had the opportunity of inspecting the rings manufactured by your company, which were used in the record breaking Robin.

We found these rings in excellent condition and their worth was well demonstrated by the lack of carbon in the cylinders, and the good compression in the engine after its long run of 420 hours, 21 minutes, 30 seconds. The rings appeared good for many hundred additional hours.

This CHALLENGER ENGINE was tested after the flight, and without any adjustments developed approximately the same brake horse power as a new engine.

We take this opportunity of congratulating you on the excellence of your products, and your contribution towards this record flight.

Yours very truly,

CURTISS AEROPLANE & MOTOR COMPANY, INC.

Arthur Nutt  
 Chief Engineer, Motor Division.

N.W.

From the Interesting Description of the St. Louis Robin's Endurance Flight in September "Aero Digest," Page 69:

"After 420 hours of continual flight . . . the reports given by the fliers indicate that the engine was still delivering its maximum power. The fact that the engine at the end of the run was using less gasoline per hour substantiates this report. A slight additional amount of oil was being used, although this was negligible and resulted from slight external gasket leaks."

The St. Louis Robin  
 Was Equipped with

**U S SPECIAL AVIATION PISTON RINGS**



OUR CONGRATULATIONS TO:

Curtiss-Robertson  
 Curtiss Aeroplane  
 O'Brine and Jackson

**U. S. HAMMERED PISTON RING CO.**  
 PATERSON, N. J.

U. S.  
 Side-  
 Expansion  
 Oil-Control  
 Ring with  
 Tapered Sides

## PARKS MAKES IT EASY

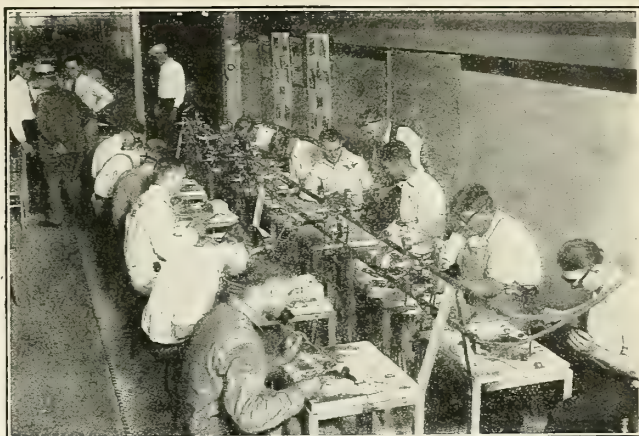
In other days the education of a competent, well-rounded aviation mechanic was a long and painful process. Years of work on inadequate flying equipment, odd jobs about the flying field, long hours of labor in blistering summer and the coldest winter weather, in flimsy, inadequate shops—all these went into the education of the man behind the man who flies the plane.

### *There's a Difference Now*

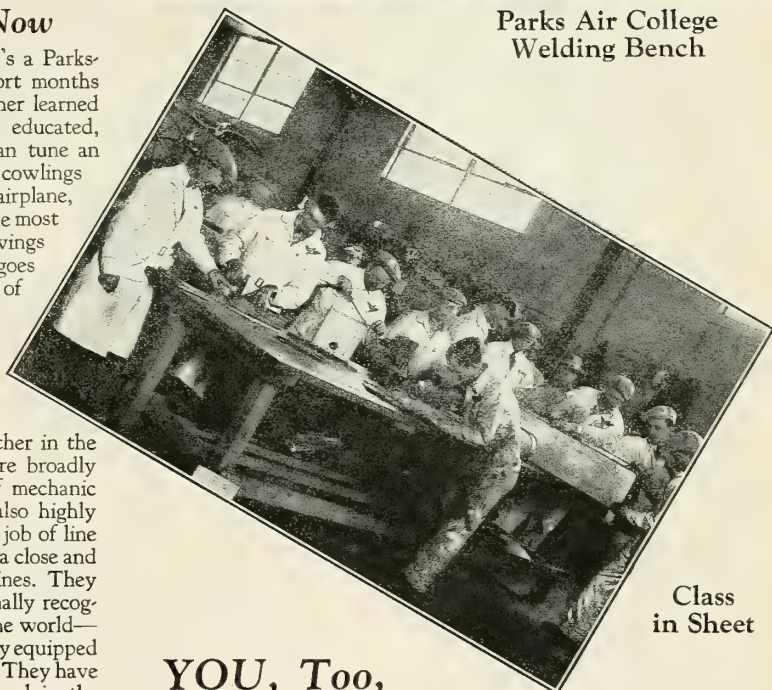
The aviation mechanic of today—if he's a Parks-trained man—has learned in a few short months more than his experience-educated brother learned in years. He's a well-rounded, highly educated, smart and competent workman. He can tune an engine, weld metal, build wings, make cowlings and other sheet metal parts, assemble an airplane, overhaul its engine, "shoot trouble" on the most complicated power plant, dope and paint wings and fuselages—in short, do any task that goes into the manufacture or the maintenance of an airplane.

### *That's Why Parks Men Are in Demand*

They fit easily into any organization, either in the factory or on the line. Because they are broadly trained they are ideal material for chief mechanic or factory foreman. Because they are also highly specialized they fit equally well into the job of line mechanic or any other post that requires a close and thorough knowledge of airplanes and engines. They have been trained in what is internationally recognized as the finest mechanics school in the world—in buildings that are as modern and as fully equipped as the most up-to-date airplane factories. They have been educated in the largest flying school in the world—rubbed shoulders with hundreds of flyers and achieved an appreciation of the flyer's viewpoint that few mechanics ever get. They have been trained to work on flying equipment that is "on the fly" daily from dawn to dark. They have received their knowledge from instructors who are veterans in the flying game—teaching experts with a record of turning out hundreds of successful mechanics.



Parks Air College  
Welding Bench



Class  
in Sheet

## YOU, Too, Can Be a Parks Mechanic!

It's not hard to make your way to success in aviation if you travel the Parks way. Only remember this—TODAY is the time to enter aviation. TODAY is the day to start in this amazingly wealthy industry. The coupon below will get you on your way. Fill it out and get it in the mail—NOW—just as soon as you lay this book down.



Largest Civilian Air School in America!  
BOX 226-MU, EAST ST. LOUIS, ILL.

Member Aeronautical Chamber of Commerce of U. S. A

Parks Air College has been rated by the Aeronautics Branch, Department of Commerce, as an Approved Transport Ground and Flying School

### MAIL THIS TODAY!

PARKS AIR COLLEGE,  
Department 226 M U  
East St. Louis, Ill.

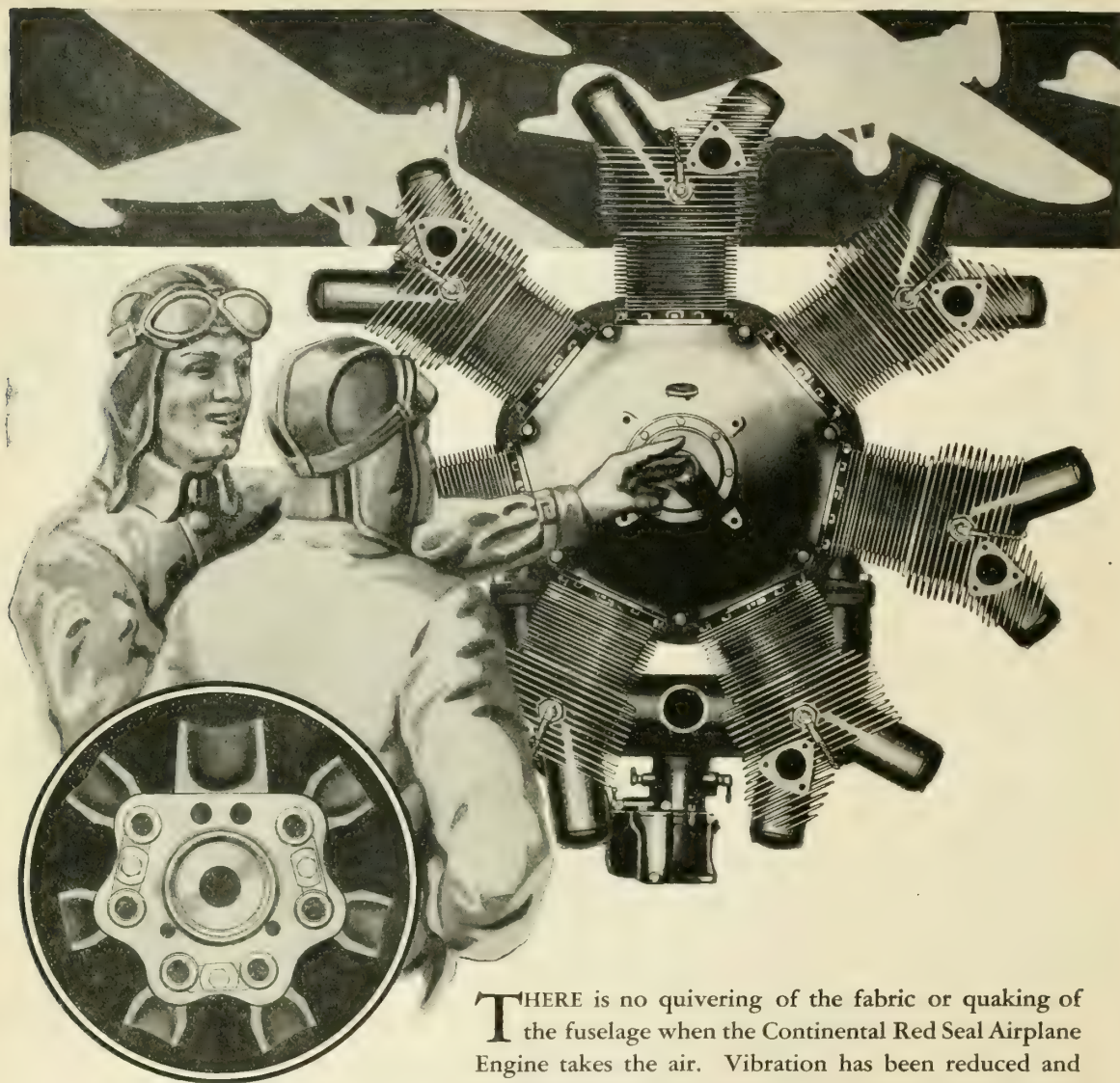
Send me your illustrated catalog. I am interested in Aviation.

Name.....

Address.....

City.....State.....





## Safety

Connecting rods are subject to great stress. Failure of these parts is safeguarded by securing each articulated rod to the master. Knuckle pins are slotted where they project beyond the master rod flange. Locking plates fit these slots and are secured to the master rod with screws which are held from turning by washers turned up against the flat of the head and down beside each plate.

THERE is no quivering of the fabric or quaking of the fuselage when the Continental Red Seal Airplane Engine takes the air. Vibration has been reduced and the plane itself is as steady as the hum of the engine that carries it along. For Continental has considered smoothness and strength of paramount importance in building this engine. Smoothness that shows in every flight and strength that prolongs this smoothness for years. The Continental Red Seal Airplane Engine combines light weight and perfect balance with rugged dependability and then adds to these qualities a lack of vibration that surprises pilots and passengers alike.

CONTINENTAL AIRCRAFT ENGINE CO.

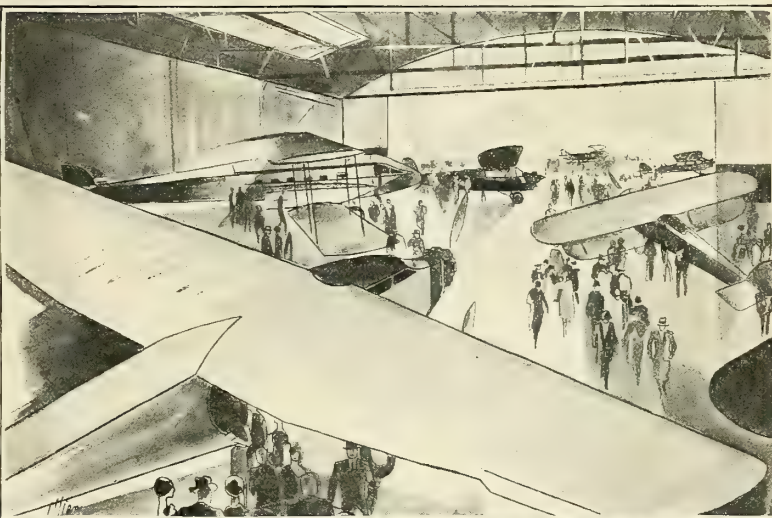
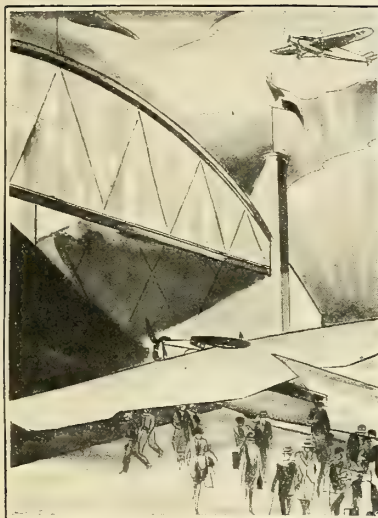
Office and Factory: Detroit, Michigan



# Continental Engines

# A GREAT AVIATION CENTER

*has been built at CENTRAL AIRPORT*



CENTRAL AIRPORT is but 15 minutes' drive from the heart of Philadelphia, over broad highways and the Delaware River Bridge. Among the features of its equipment, in addition to enormous fire-proof, heated hangars, are weather service, radio, complete lighting for night flying, ticket and administration offices, waiting and rest rooms, a splendid restaurant, two swimming pools with a sand beach, parking space for 4000 cars. The field has eight runways of 2500 feet, 3600-foot runway in the direction of the prevailing wind, macadam taxi and take-off strips. Perfect natural drainage in all seasons.



CENTRAL AIRPORT is the aviation crossroads of the East. Situated midway between the financial and political capitals of the country, and near to both; at the population center of the Atlantic coast, and almost at its geographical center, Central Airport is the heart of the growing system of eastern airways.

Since its establishment, every eastern event of sectional or national significance in commercial aviation has sought the safety, the accessibility, the complete service and equipment of Central Airport. All the eastern divisions of the National Air Races started from here late in August. The official dedication, this past week, was attended by the foremost figures in aviation in America. The mighty armada of the National Air Tour, contesting for the Edsel B. Ford Trophy, will come to rest at Central Airport early in October.

Central Airport is the focal point for

aviation in the Philadelphia-Camden area, with its three million people, its thousands of factories, its industries devoted to the production of metals, woods, textile finishes, equipment, instruments and parts for the aviation industry.

Every form of airplane and engine service is established at Central Airport, organized to serve both the private flier and the transport organization desiring the enormous mail, express and passenger loads originating in this vast community. Land adjoining the field is available to the aircraft manufacturer; storage, display and office space, to the airplane and engine distributor. A great aviation center has been built at Central Airport. And the aviation industry is rapidly making it greater. Detailed information will be furnished any one requesting it. Central Airport, Inc., Fidelity-Philadelphia Building, Philadelphia, Pa.

PHILADELPHIA-CAMDEN

# CENTRAL AIRPORT





## A RECORD AND A WIRE

Spokane, Wash.  
August 21st, 1929

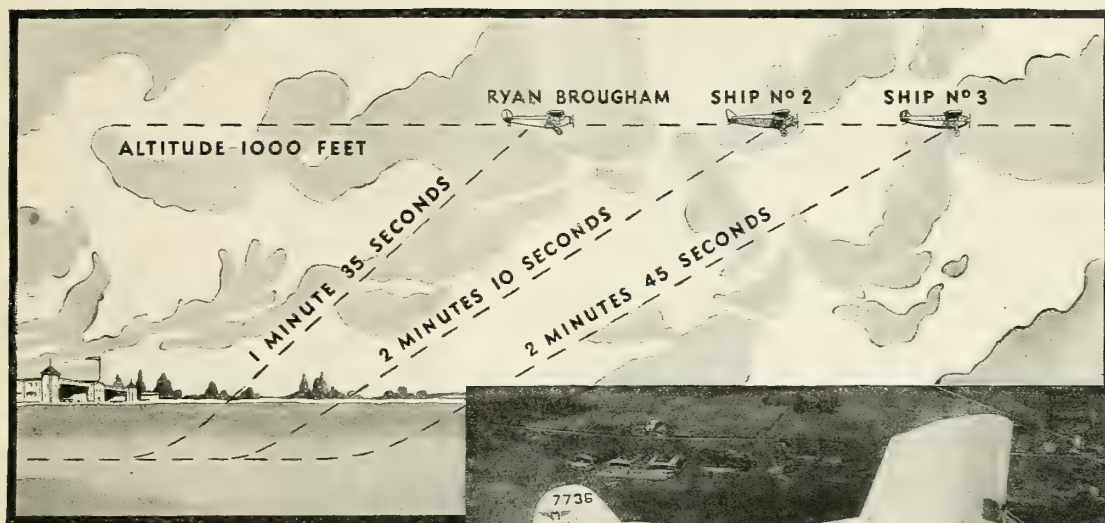
Successfully completed ocean to ocean nonstop refueling flight covering more than seventy two hundred miles stop Please accept our sincere congratulations to the Buhl Aircraft Company and its engineer in designing a ship which possesses such remarkable features of durability stability and comfort stop Its performance at high altitudes under varying weather conditions carrying heavy overload of eight hundred pounds was noncomparable stop Accommodations in cabin in spite of extra tanks gave us much needed space for moving about and sleeping stop Words cannot express our appreciation of the ship itself and for our many needs which were foreseen and provided for by your company stop With best personal wishes

(Signed) Mamer & Walker

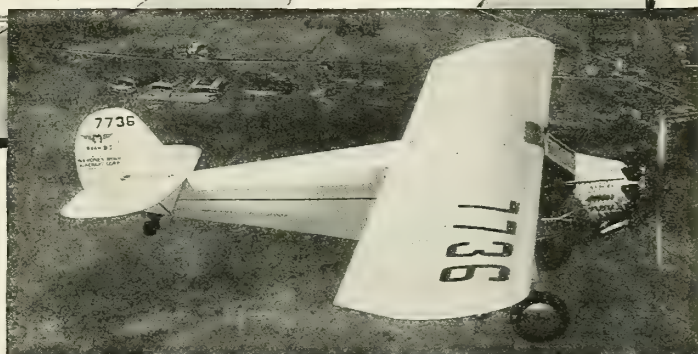
**BUHL** *Aircraft Company*

MARYSVILLE, MICHIGAN

# FOR TAKE-OFF AND CLIMB —BEST INSURANCE IS A RYAN



*In a recent competitive test for take-off and climbing ability held in Chicago, a standard Ryan Brougham conclusively demonstrated its superiority among ships of its class. The results of this test are diagrammed above and described below.*



**C**ARRYING six people and 100 gallons of gasoline, a standard Ryan B5 Brougham took off from a Chicago Airport and climbed to an altitude of 1,000 feet in 1 minute and 35 seconds.

Ship No. 2, in competition with the Ryan, carried six people and 97 gallons of gasoline and required 2 minutes and 10 seconds to take off and gain a height of 1,000 feet.

Ship No. 3, with load of six people and but 85 gallons of gasoline, took off and reached 1,000 feet altitude only after 2 minutes and 45 seconds.

This marked victory of the Ryan Brougham — not in a "trick" demonstration, but in a competitive test with an impartial buyer as judge — furnishes further proof that the Ryan will outperform all other ships of equal load and power.

Powered by the new Wright 300 H. P. J6 Whirlwind motor — with installation properly related to the ship's design — today's Ryan will take off fully loaded in 275 feet, and in 8 seconds time, will climb at the rate of 1200 feet a minute, and will land in a 200 foot circle. It provides top speed of 140 miles per hour and cruising speed of 120 miles per hour. Cruising radius is 700 miles.

Write for illustrated catalog describing details of Ryan design and construction. Learn why Ryan's performance and safety records are unexcelled by ships of its class.

## RYAN AIRCRAFT CORPORATION

*Division of*

DETROIT AIRCRAFT CORPORATION

Lambert—St. Louis Airport  
ANGLUM, MISSOURI



SISTER SHIP OF THE "SPIRIT OF ST. LOUIS"

*Department of Commerce Approved Type Certificate No. 142,  
including land gear and pontoons*





## WINGING ITS WAY TO POPULARITY

BUSINESS FLYING, when viewed from the standpoint of "profit," warrants the utmost consideration in the purchase of a plane. Disregard claims, adjectives and superlatives, — make your own flight tests, — fly any ship of equal capacity, then fly the "Invincible." Its performance will startle you, its passenger comforts appeal to all. Fly an "Invincible" and you will buy an "Invincible." Details cheerfully mailed to interested parties.

Powered by a Curtiss Challenger 170 H.P. motor, the "Invincible" climbs the first thousand feet in fifty seconds, cruises 700 miles at 120 M.P.H. and has a top speed of 142 M.P.H. Four-place completely equipped, luxuriously appointed, \$7,800.00 at factory. Details also of the Two-Place Invincible Center-Wing Monoplanes upon request.

For details address the  
Aircraft Division  
INVINCIBLE METAL  
FURNITURE CO.

Manitowoc  
Wisconsin



# DAVIS WINS

## All-Ohio Derby in National AIR RACES



AVERAGING 112.8 miles an hour over the entire route of 533 miles, the Davis Monoplane won the All-Ohio Derby with an elapsed time of 4 hours, 43 minutes, 15.16 seconds. The Davis was powered with the new LeBlond "66" motor, and with Lieut. Pat Love, general superintendent of the Davis Aircraft Corporation piloting, led its nearest competitor by more than 16 minutes at the finish.

In and out of all kinds of fields—over all kinds of territory—the Davis again proved its inherent soundness of design and construction, just as its predecessor, "The American Moth," did a year ago in winning the Los Angeles-Cincinnati Derby and finishing second in the New York-Los Angeles Derby. This same plane also finished second in the Miami-Cleveland Derby this year.

The Davis V-3 Monoplane, powered with the LeBlond "60," will *not* average 112 miles an hour. But

it *will* deliver the performance given below—honestly and surely. And with this performance you'll also find in the Davis V-3 something that words and figures cannot tell—airworthiness and stability far beyond previous light-plane experience . . . All-metal in construction, with exception of wing spars and fabric, the V-3 is as economical in maintenance as in operation.

For complete information about the Davis V-3, please write us. We shall be glad to forward you the information, and arrange a demonstration if you desire it.

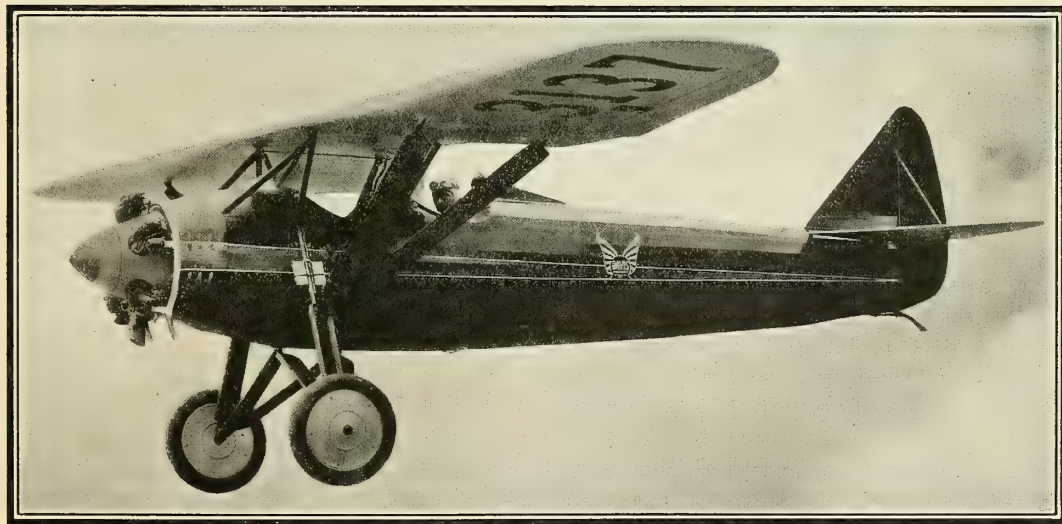
*Many rich territories are still open. Responsible dealers are invited to write for complete details of the Davis franchise.*

### DAVIS AIRCRAFT CORPORATION

Richmond, Indiana

#### PERFORMANCE (Actual)

Service Ceiling . . . . .	10,000 feet
High Speed . . . . .	95 miles M. P. H.
Landing Speed . . . . .	38 M. P. H.
Cruising Speed . . . . .	80 M. P. H.
Climb . . . . .	700 feet per minute
Fuel Consumption at Cruising Speed . . . . .	4½ gallons per hour
Cruising Range . . . . .	350-400 miles



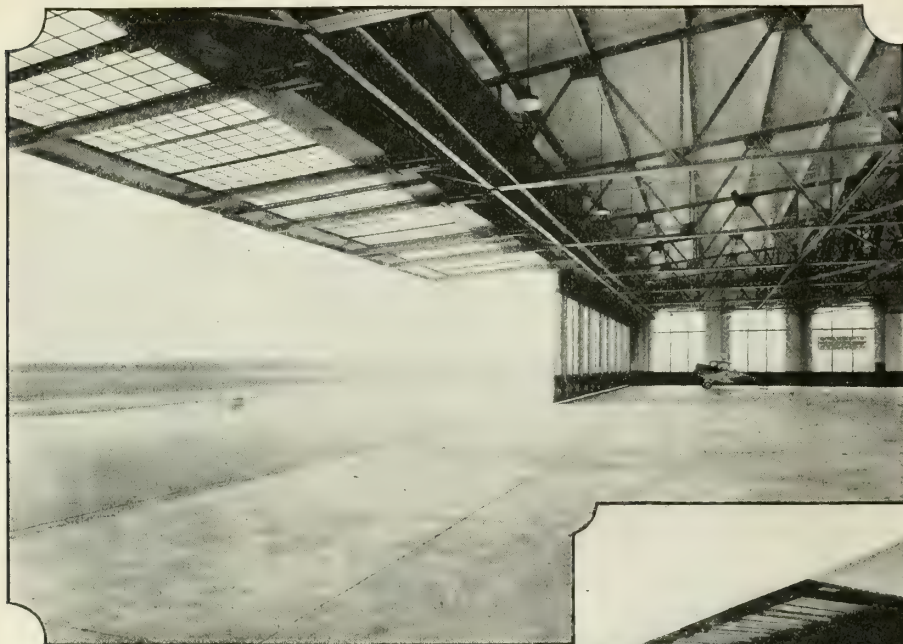
V<sub>3</sub>

\$2965 Flyaway at field  
Complete with LeBlond  
60 h.p. Radial Engine

# DAVIS MONOPLANE

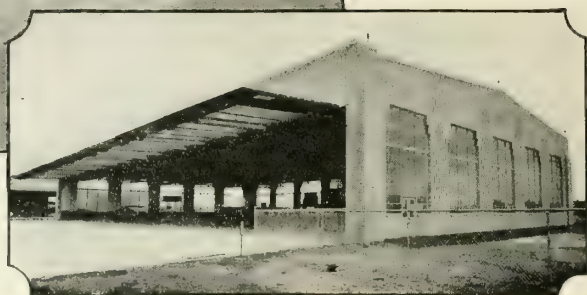
A TWO-PLACE HIGH-WING MONOPLANE—"THE AMERICAN MOTH"





**HANGAR  
DOOR  
PROBLEM  
SOLVED!**

*New cantilever hangar at Cleveland designed and built by Austin, one of the largest in the world. Canopy doors, power-operated, open or close independently or in any combination.*



# New!

*The Canopy Door that opens an entire hangar wall in 50 seconds at the press of a button*

**Quick Opening**—Clear Open Canopy Doors open or close individually or in any combination in 50 seconds. When open, they provide added shelter.

**Power Operated**—Each door individually, or all doors together, controlled by pressing a button.

**Simple design**—Few moving parts and fool-proof mechanism mean uninterrupted service.

**Rugged Construction**—All steel plate, steel sash and heavy structural steel members make this the strongest door on the market today. Doors can withstand most extreme wind pressure whether open or closed.

**Positive Action**—Doors are under full control at any position, and in either direction, under all weather conditions.

**Weathertight**—Doors fit closely but without the slightest binding. They completely shut out wind, rain or snow, even in continued storm.

**Low Maintenance**—Simple Mechanical Design, Rugged Steel Construction, and Unique Principles of Operation practically eliminates all maintenance expense over a period of many years.

**No Posts or Columns**—Doors raise and lower as complete units, with no posts in between, no rails on the floor, and permit of limitless clear door opening.

*Send the memo below for full information, or phone the nearest Austin Office, wire or write.*

AVIATION DOOR DIVISION

## THE AUSTIN COMPANY

*Airport Engineers and Builders • Cleveland*



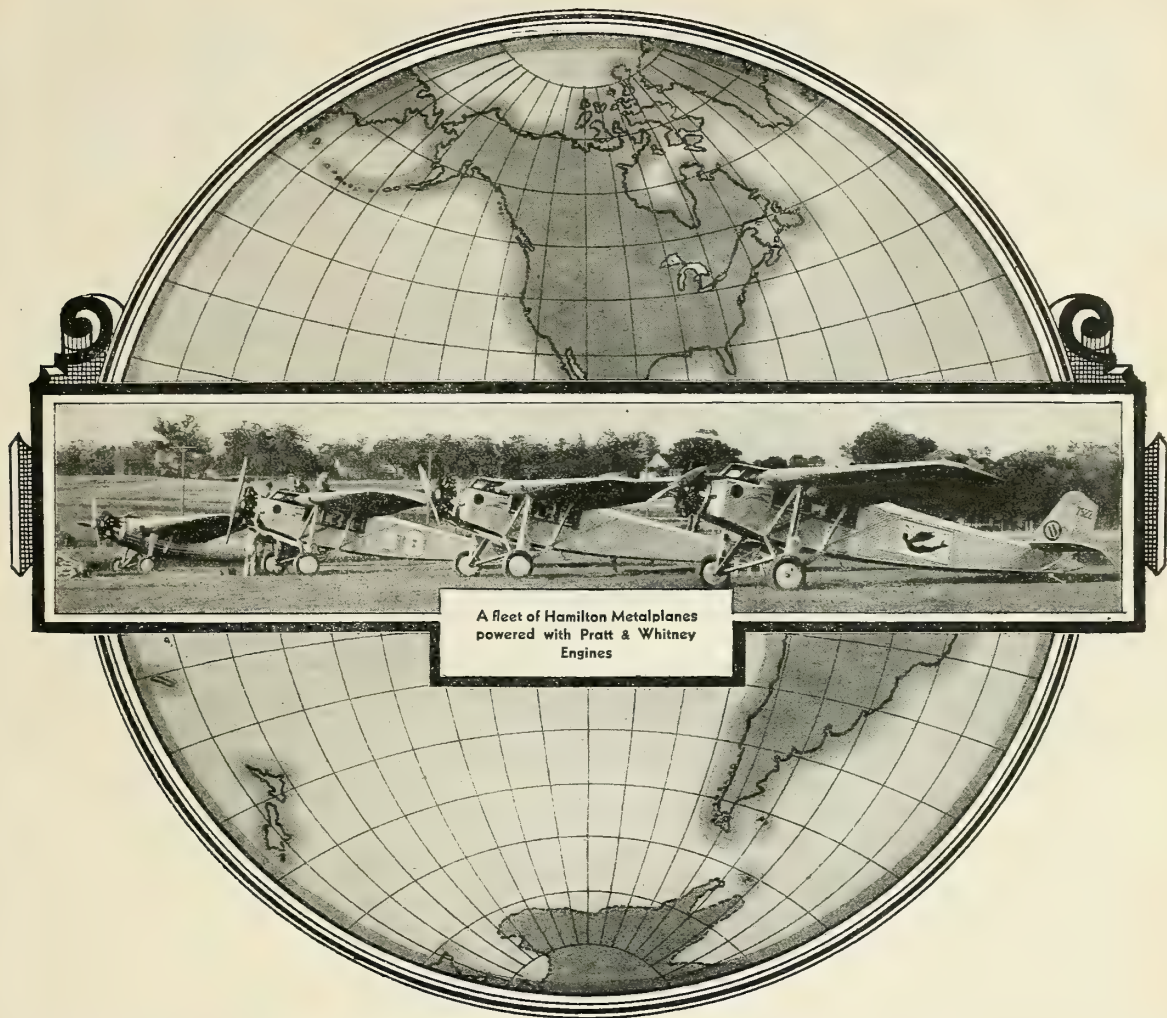
New York Chicago Philadelphia Detroit Cincinnati Pittsburgh St. Louis Seattle  
Portland Phoenix The Austin Company of California: Los Angeles, Oakland and San Francisco  
The Austin Company of Texas: Dallas The Austin Company of Canada, Limited



Memo to The Austin Company, Cleveland—Please send us literature and further information about Canopy Doors. We are interested in a Hangar.....x.....ft. with a clear door opening.....ft. wide x.....ft. high. Name.....

Position..... Firm..... City..... AD-10-29

Say you saw it in AERO DIGEST



## EVERY HAMILTON METALPLANE *ever built IS STILL IN OPERATION*

THE foregoing statement is entirely in line with the new standards of safety, durability and continued service that Aluminum and its alloys have brought to aircraft design.

Great fleets of Hamilton Metalplanes are in the air continuously—under every flying condition to be encountered between the Arctics and the Tropics.

Every one of them has met these conditions safely, satisfactorily, economically.

Hamilton designers have secured unusual strength, lightness and freedom

from the corrosive action of the elements through the use of ALCLAD—strong heat treated Aluminum alloys, surfaced with pure non-corrodible Aluminum.

Aluminum Company of America, creator and producer of ALCLAD, invites inquiry, correspondence and personal contact with its technical staff on any phase of the application of Aluminum to aircraft design.

Aluminum Company of America

2484 Oliver Bldg., Pittsburgh, Pa.

Offices in 19 Principal American Cities



# ALUMINUM AND ITS ALLOYS FOR AIRCRAFT





## WACO wins again

In her first season as a pilot, and with only a scant half-hour behind the controls of this particular ship preliminary to the event, Gladys O'Donnell borrowed a WACO and placed second in the Santa Monica-Cleveland Derby.

Then, at Cleveland, in a WACO Taper-Wing, she stepped out and had a walk-away in the closed course race for women, actually lapping every competitor. She also won the Australian pursuit race and finished up by winning the race to Pittsburgh.

WACO built no special "race" jobs for the Cleveland events. The evidence is the more conclusive of the WACO Taper-Wing's masterly performance. Full details at your request.

THE WACO AIRCRAFT COMPANY

TROY, OHIO



*"Ask any pilot"*



Every  
Hour  
Was  
Needed—  
*and we saved* **Weeks!**

**T**IME is the essence of the contract in the construction of many airports.

For that reason the speed with which Armco drainage can be installed is of major importance to airport engineers and managers.

Long sections of Armco Perforated Iron Drains may be readily obtained in all sizes for immediate delivery.

The light weight of these sections makes haulage and handling rapid and easy. Installation of the pipe with rock backfill is speedy, even with a limited crew.

And the saving in time exacts no unforeseen penalty. The drainage system

is in to stay. It is proof against the crash and crush of heavily loaded gasoline trucks, weighty rollers, planes landing with the impact due to high speed and concentrated loads.



Armco culverts and drains are manufactured from the Armco Ingot Iron of The American Rolling Mill Company and always bear its brand

Continued resistance to strains and stresses from all causes, and to corrosion and erosion is the unfailing result of—Pure Iron and the Armco construction—flexibility. One assures years of endurance. The other provides strength—to give under overload.

Let us tell you more. Just a word from you brings ample corroboration of all statements—and working facts.

ARMCO CULVERT MANUFACTURERS ASSOCIATION  
Middletown, Ohio

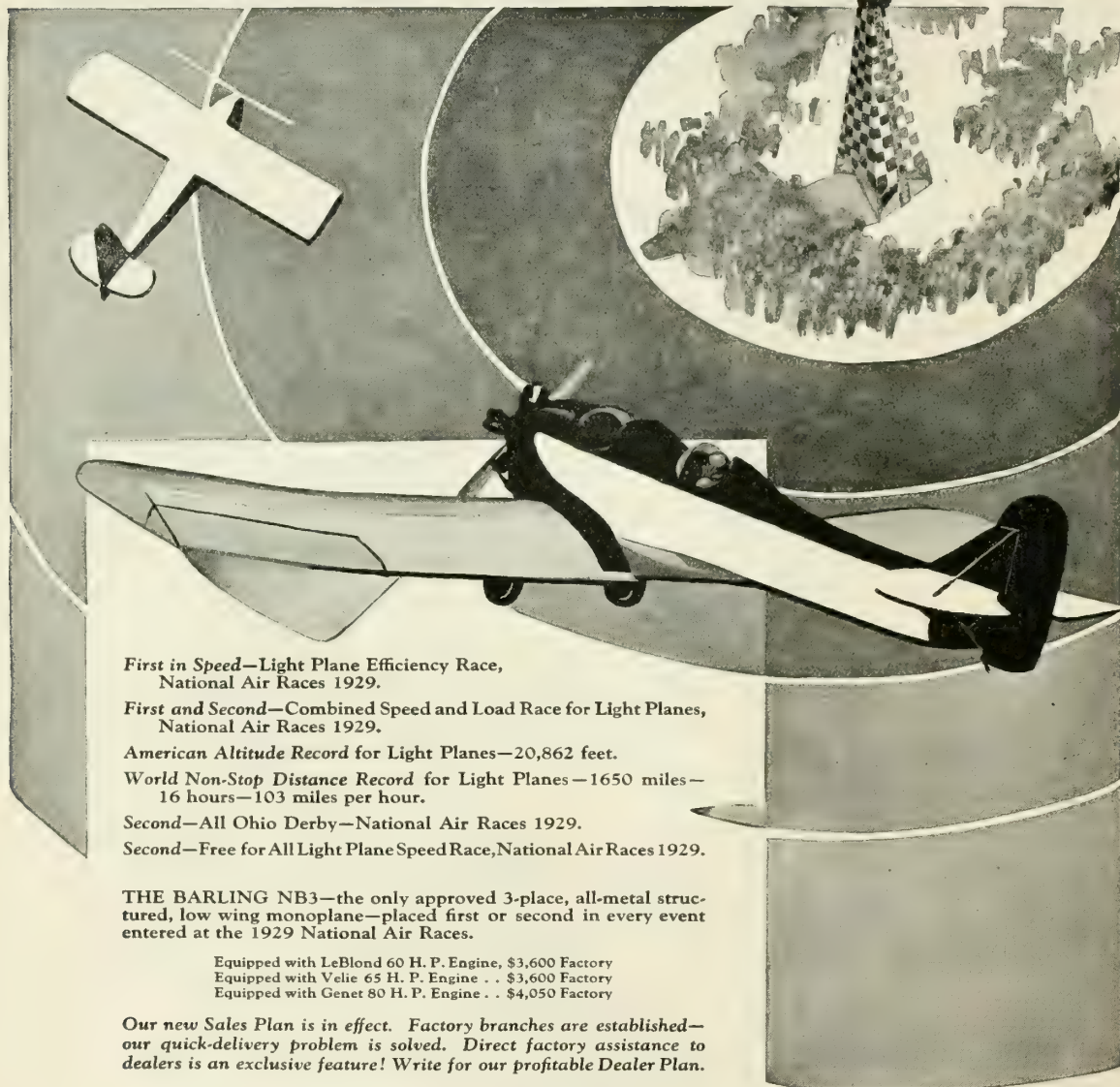
**ARMCO** *perforated* **PIPE**

© 1929, A. C. M. A.

Say you saw it in AERO DIGEST



# Performance Beyond Horse-Power The BARLING NB3 Proves It!



*First in Speed*—Light Plane Efficiency Race,  
National Air Races 1929.

*First and Second*—Combined Speed and Load Race for Light Planes,  
National Air Races 1929.

*American Altitude Record* for Light Planes—20,862 feet.

*World Non-Stop Distance Record* for Light Planes—1650 miles—  
16 hours—103 miles per hour.

*Second*—All Ohio Derby—National Air Races 1929.

*Second*—Free for All Light Plane Speed Race, National Air Races 1929.

THE BARLING NB3—the only approved 3-place, all-metal structured, low wing monoplane—placed first or second in every event entered at the 1929 National Air Races.

Equipped with LeBlond 60 H. P. Engine, \$3,600 Factory  
Equipped with Velie 65 H. P. Engine . . \$3,600 Factory  
Equipped with Genet 80 H. P. Engine . . \$4,050 Factory

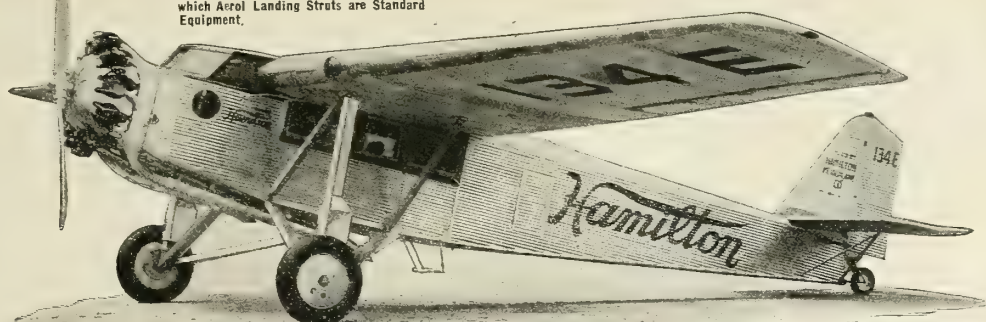
*Our new Sales Plan is in effect. Factory branches are established—our quick-delivery problem is solved. Direct factory assistance to dealers is an exclusive feature! Write for our profitable Dealer Plan.*

NICHOLAS-BEAZLEY AIRPLANE CO., Inc.  
Manufacturing Division      Marshall, Missouri

# BARLING NB3

*Monoplane*

One of a Series of Advertisements of  
The Cleveland Pneumatic Tool Co.  
featuring the 23 makes of Planes on  
which Aerol Landing Struts are Standard  
Equipment.



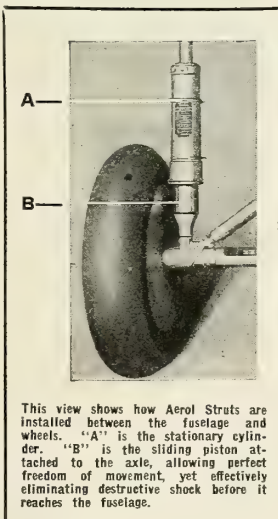
## AEROL STRUTS ARE STANDARD EQUIPMENT ON HAMILTON METAL PLANES

PROMINENT among the 23 manufacturers who have standardized on Aerol Landing Struts is the Hamilton Metalplane Division of The Boeing Airplane Company.

In selecting Aerol Struts, Hamilton engineers joined the fast-growing group which acknowledge the oleo-pneumatic principle as the ultimate and logical solution to the problem of absorbing landing shock.

The dominance of Aerol Struts was borne out at the recent National Aeronautical

Exposition in Cleveland. On the 49 ships exhibited, Aerol Struts led all other makes of shock absorbers in number of ships equipped.



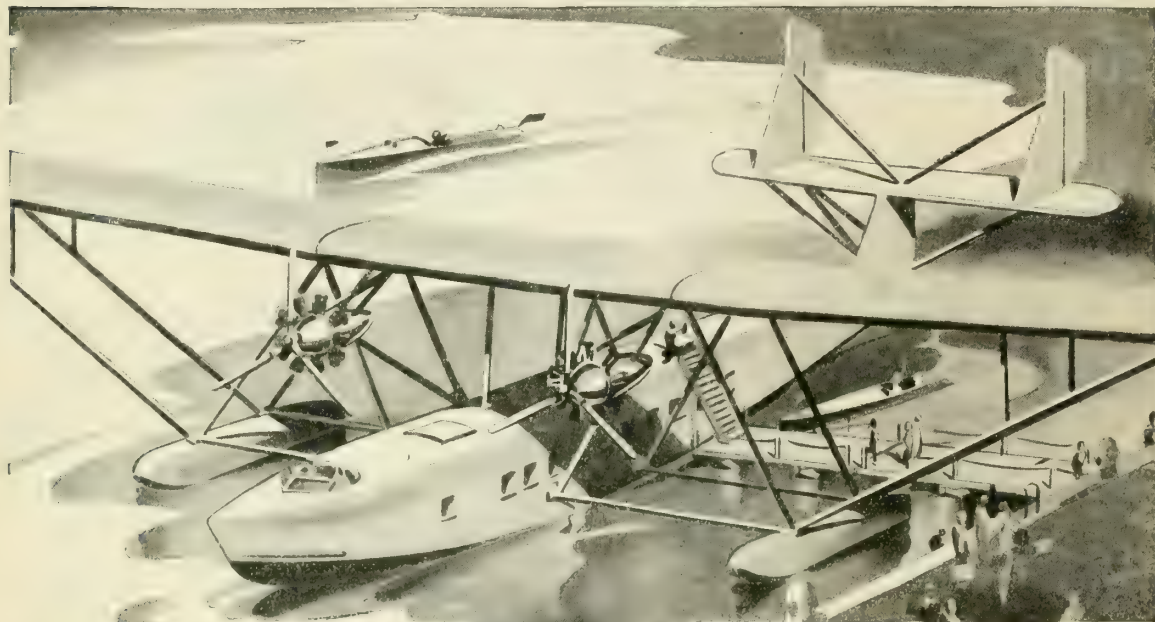
Aerol Strut Engineers are at the disposal of manufacturers in incorporating the units in the under-carriage designs. If your ships are not among the predominant number who offer Aerol Struts as standard or optional equipment, get in touch with our engineering department. The Cleveland Pneumatic Tool Company, Cleveland, Ohio.

ASK THE PILOTS WHO LAND ON THEM

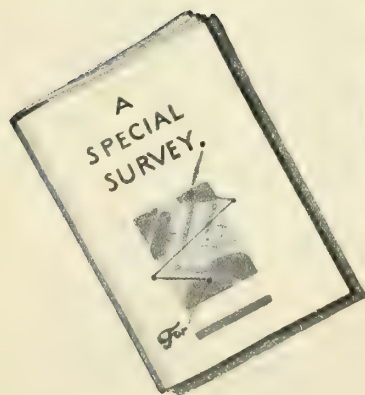
**AEROL** *shock absorbing* **STRUT**



# FACTS AND FIGURES . . . . . THAT SHOW HOW AND WHY



**A**RE you one of a group of far-sighted business men who desire to profit by the rapid expansion of air transportation? If so, you have problems which we can help you solve. We are prepared to make—for any responsible air transport organization, present or proposed—a complete survey of facts and figures that show how—and why. We will demonstrate to you the payload profit possibilities of Commodore flying boats. Write for questionnaire which will enable us to make this survey without cost or obligation to you.



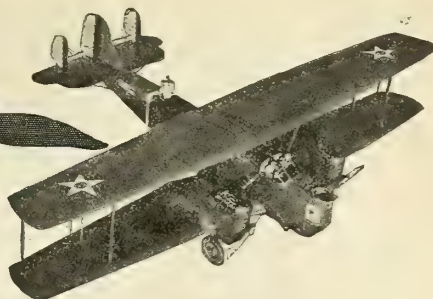
CONSOLIDATED AIRCRAFT CORPORATION  
BUFFALO, NEW YORK

▲ ▲ ▲

*The* **COMMODORE**



# WANTED PILOTS



## Let Greer Train You for a Big Future in AVIATION

**Mechanics  
Repairmen  
Assemblers  
Engineers  
Builders  
Contractors  
Motor  
Experts  
Designers  
Instructors  
Salesmen**



Ask yourself this question: What will the aviation industry amount to in a year or so? And you know the answer—it will be America's most gigantic industry.

And question number two: Isn't it logical to assume that the men who get into aviation now will grow with the industry and be among the leaders "tomorrow?" We all know that to be so.

Even today, though aviation is still in its infancy, there is a big demand for pilots, for men in aviation factories—air transport companies—passenger and express service—air mail—barnstorming—aerial photography, motion picture work, crop dusting, etc. Opportunity! Fellows, aviation teems with it. Reason it out for yourself: thousands of passengers and tons of mail and freight are now being swiftly and safely carried all over the country daily. Manufacturers are all behind in supplying the demand for airplanes. Why? Because there are not enough men ready to step in and function in the various branches of the industry.

### GREER TRAINING LEADS TO EXPERT WORK

In the great seven and four story Greer shops you learn on actual equipment. And what training! You learn metal construction—wing building—woodworking—engine repair—acetylene welding—carburetors—ignition—complete airplane construction—rebuilding—repairing—meteorology and navigation.

Is it any wonder that students from all over the world are to be found in the Greer Shops?

### REAL AVIATORS TRAIN YOU

Well-known aviators—men like C. L. Laird, with many years' experience in aviation as a designer and builder, and others who have made names for themselves in aviation—are the men who will supervise your training.

Why not insure yourself for a real future in this amazing industry?

### FARE ALLOWED TO CHICAGO

When you enroll I'll allow your fare from any point in the U. S. And don't let the lack of money hold you back. We will assist you in getting employment while you are studying—and after you graduate assist you to get a still better position.

### RUSH COUPON FOR FREE BOOK

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*Clip Coupon Quick ~ ~*

# GROUND FLOOR WORK TO THE SKY'S LIMIT !



## STROMBERG CARBURETORS

*are used as standard equipment*

*... by ...*

Aircraft Engine Corp.  
The Alliance Aircraft Corp.  
Allison Engineering Co.  
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Michigan Aero. Engine Corp.  
Navy Department  
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Warner Aircraft Corp.  
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# STROMBERG

## *growing with aviation*

Years ago when aviation was in the experimental stage Stromberg was experimenting, too, with an aircraft carburetor. One that would be dependable, light. That would supply the proper fuel mixture to the engine at all speeds, in all positions—efficiently and economically.

Such a carburetor was developed. The difficulties of propeller blast and upside down flying were overcome. A dependable, durable, eco-

nomical carburetor was designed and built.

The aviation world quickly recognized the remarkably fine performance of Stromberg carburetors. With the result that over 90% of American aircraft flying today are Stromberg equipped. And—as aviation grows, and new planes and new engines are developed, inevitably builders turn to Stromberg for the solution of their carbureting problems.

### STROMBERG MOTOR DEVICES COMPANY

58-68 E. Twenty-fifth Street, Chicago, Ill.

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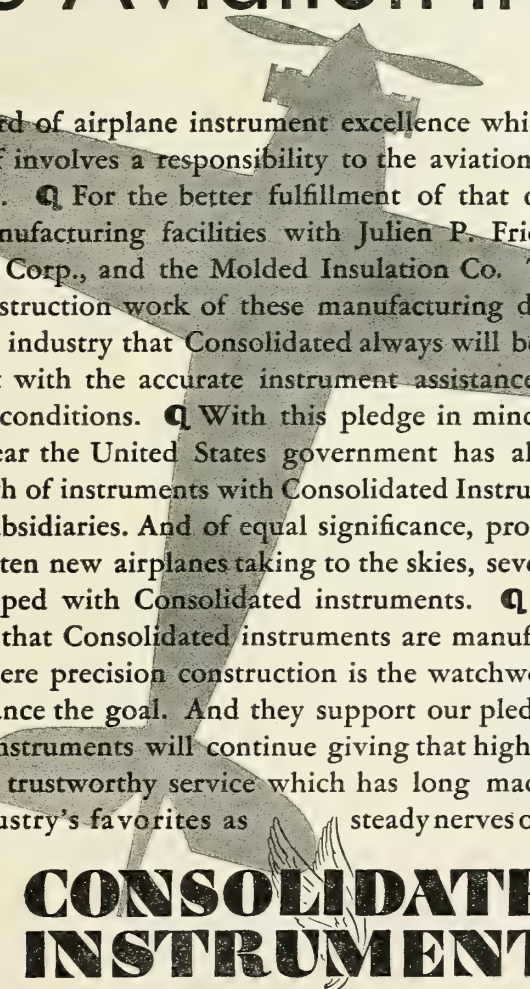
Minneapolis, Minn.

Kansas City, Mo.

London, England



# A Statement of Fact to the Aviation Industry




The high standard of airplane instrument excellence which Consolidated, years ago, set for itself involves a responsibility to the aviation industry of which we are ever mindful. ¶ For the better fulfillment of that obligation, we recently merged our manufacturing facilities with Julien P. Friez and Sons, Inc., the Aircraft Control Corp., and the Molded Insulation Co. The extensive research, testing, and construction work of these manufacturing divisions constitute our assurance to the industry that Consolidated always will be capable of furnishing plane and pilot with the accurate instrument assistance essential in meeting new operating conditions. ¶ With this pledge in mind, it is significant that thus far this year the United States government has already contracted for \$300,000 worth of instruments with Consolidated Instrument Co. of America, Inc., and its subsidiaries. And of equal significance, production figures show that of every ten new airplanes taking to the skies, seven are completely or partly equipped with Consolidated instruments. ¶ These facts justify our stating that Consolidated instruments are manufactured in modern plants where precision construction is the watchword and accurate performance the goal. And they support our pledge that Consolidated instruments will continue giving that high degree of uniform, trustworthy service which has long made them the industry's favorites as steady nerves of the plane.

## CONSOLIDATED INSTRUMENTS

CONSOLIDATED INSTRUMENT CO. of AMERICA, Inc.  
305 East 47th Street, New York City

*Manufacturing Divisions*  
Julien P. Friez and Sons, Inc., Baltimore, Md.  
Molded Insulation Co., Mt. Vernon, N. Y.  
Aircraft Control Corp., Philadelphia, Pa.







*...but wait 'til  
you get them  
up in the air;  
boys!*

**O**N the wooden forms of these upright citizens are draped several different flying suits. One is a Spalding Suit. The others are of different makes, claimed to be "just as good as a Spalding, but cheaper."

Even a keen eye might not detect much difference in suits grounded in a store window. But wait 'til you get them up in the air.

When the temperature nose dives, and the icy blasts swirl around the wind shield, and a juicy cloud bank swashes the cockpit—it is *then*, gentlemen, that a Spalding Suit is seen, or *felt*, at its thoroughbred best! Because...

Spalding Suits are not designed by tailors who've taken a correspondence course in aviation—but by fliers who've jockeyed full many a wintry cloud. Out of their numbing experiences have emerged suits that keep you dry—and *warm*...suits that fully protect, without being clumsy!

One such suit is the Spalding one-piece, slip-on suit, illustrated on the left figure above. An outer shell of waterproof Bedford cloth sheds water like a spaniel. An inner layer of soft wool fleece buffers off any penetrating wind. The large electrified lamb fur collar warmly cozies your neck and ears. And five hookless fasteners permit donning, and doffing in a jiffy. Good for many years of constant service—priced fairly at \$65.

Spalding has, of course, a complete stock of flying equipment. It is carried by all Spalding stores, and at many of the leading fields. Get the free catalog.

*A. G. Spalding & Bros.*  
AVIATION EQUIPMENT

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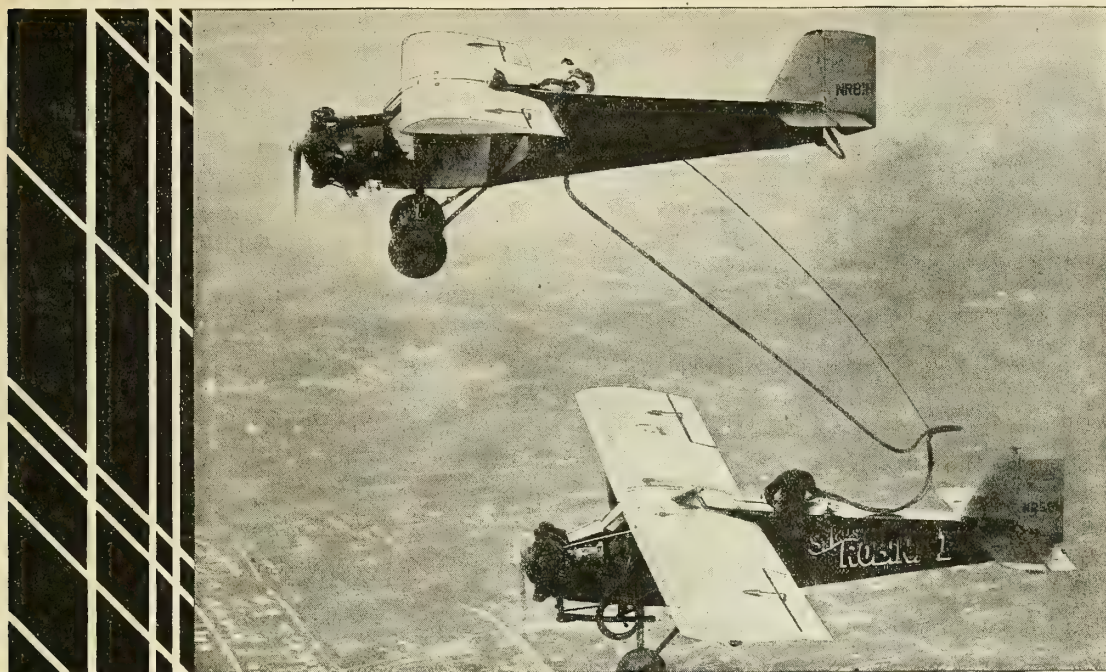
A. G. SPALDING & BROS.,  
105 Nassau Street, New York City

B 10-29

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Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_



# Endurance, Speed with NATURALINE!

**420 hours and 21 minutes in the air**, consuming throughout 3,190 gallons of Naturaline. That's the phenomenal record of the St. Louis Robin I, completed on the evening of July 30.

Two wonderful pilots, a wonderful engine, a faithful and capable refueling crew, and *Naturaline* made the combination that bettered the previous world's record by 173 hours, 37 minutes, and 28 seconds.

Naturaline was used throughout with such satisfying results to

the flyers that when their trained ears detected a falter they asked immediately if Naturaline was being furnished as before. This great endurance flight, coupled with the known worth of Naturaline as a speed fuel, establish it as the aviation fuel par excellence.

For full information about



Write to  
**Naturaline Co. of America**  
Tulsa, Okla.

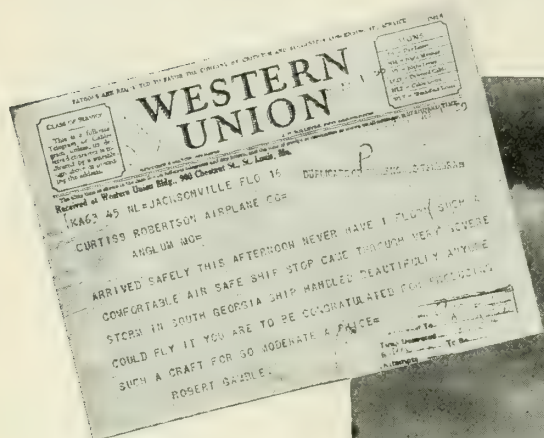


**Naturaline's speed performance** was conclusively demonstrated at the Gardner Cup Races held at St. Louis May 30th. Bringing home the first four planes in competition with five other gasoline brands. The picture above is that of "Speed" Holman, the winner, who enthusiastically endorses Naturaline.





# Again **ROBIN** proves *All-weather, All-purpose Plane*



## Endurance Holder's Sister Ships making notable Service Records everywhere

**A**HURRIED business man on a quick flight south. Over Georgia—a sudden, fierce, semi-tropical storm. Slashing sheets of rain . . . tree tops nearly touching the ground . . . all living things scurrying for the nearest cover.

Next day comes a wire—the wire shown above—“... Ship Handled Beautifully Anyone Could Fly It You Are To Be Congratulated . . .”

Congratulations!

To Curtiss these reports of the Robin from the flying fields of the world mean much. Steady, sure service for every flying purpose . . . dependable, consistent performance in fair or foul weather.

They prove just what their famous sister ship, the St. Louis endurance plane, proved. That the Robin can be depended on under all flying conditions.

Discover for yourself what the St. Louis Robin endurance flight proved. What owners of the Robin are proving every day. That Robin is the best all-purpose, all-weather plane in its price range.

### *Robin Proves Splendid Training Plane*

The quiet of the cabin allowing natural conversation. The confidence-breeding stability . . . the high range of visibility . . . the lack of vibration . . . make the Robin the best cabin training plane of today.

And remember. Behind all Curtiss products stands the nation-wide Curtiss Service. Forty Curtiss Branches . . . strategically located to give complete, prompt service to all Curtiss owners.

Write to us at once and let us send you full information about the Robin—and about the nearest branch to you. Department 12, Curtiss Flying Service, 27 West 57th Street, New York City.

Sales agents for Curtiss-Robertson Airplane Mfg. Co., Cessna Aircraft Co., Curtiss Aeroplane and Motor Co., Incorporated, Ireland Aircraft, Incorporated, Command-Aire, Inc., Moth Aircraft Corporation.



## **CURTISS FLYING SERVICE**

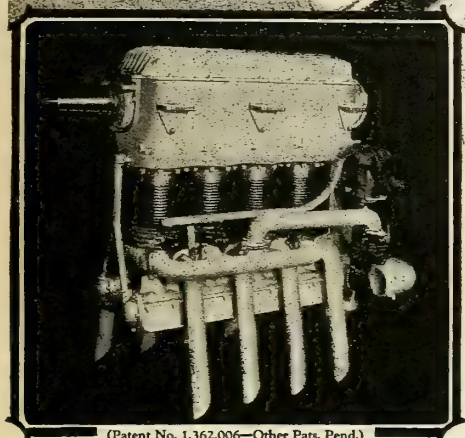
*“World’s Oldest Flying Organization”*



# Chevolaair

## D-6

# WINS!



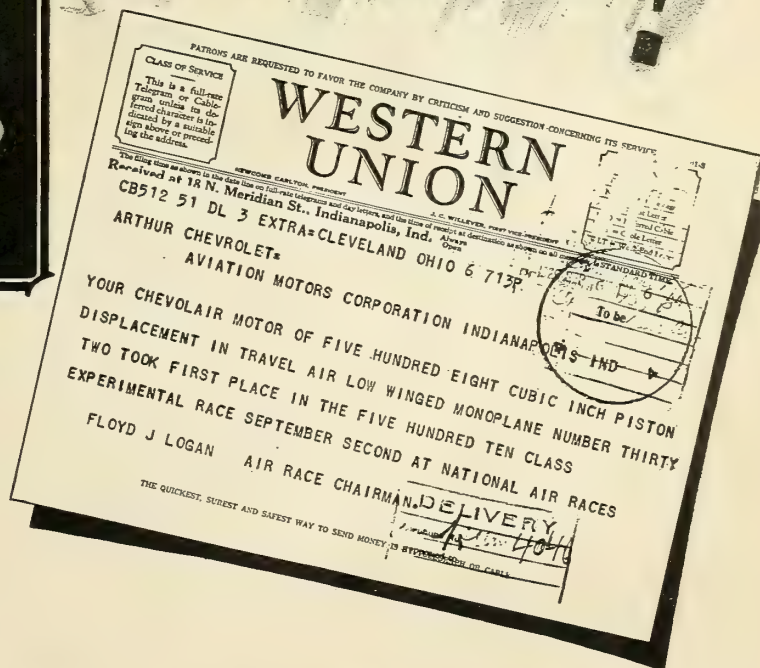
(Patent No. 1,362,006—Other Pats. Pend.)

### The CHEVOLAIR SUPER-SAFETY DUAL MOTOR

In-line. Inverted. Air-cooled. Dual construction throughout.

D-4 4-cylinder motor

D-6 6-cylinder motor



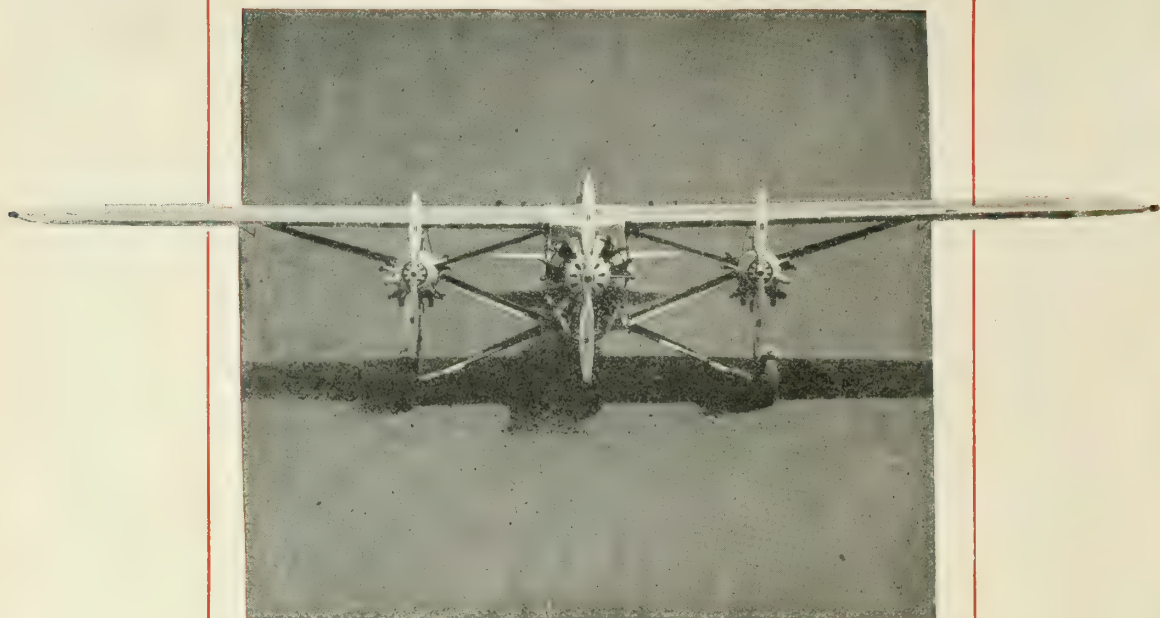
## ARTHUR CHEVROLET AVIATION MOTORS Corp.

*The Heart of the Plane is its Motor*

408 WEST TENTH STREET

INDIANAPOLIS, IND.





1<sup>st</sup>

THE *FASTEST* TRIMOTOR TRANSPORT  
*at the National Air Races*



*BACH AIRCRAFT*  
*Los Angeles Metropolitan Airport*

*SCHLEE-BROCK CORPORATION, DETROIT, MICHIGAN*  
(Eastern Distributors)

Say you saw it in AERO DIGEST



**2<sup>nd</sup>**

THE *2ND FASTEST* TRIMOTOR TRANSPORT  
*at the National Air Races*



*COMPANY, Incorporated*  
*Van Nuys, California*

*SCHLEE-BROCK CORPORATION, DETROIT, MICHIGAN*  
(Eastern Distributors)



# For Happy Landings

By deftness of design and the perfect co-ordination of the soundest principles of aerodynamics the Whittelsey Avian gives a flying performance that no other light plane can approach. Among pilots it is recognized as the outstanding plane for training and sport. The safest to fly, the easiest to land.

In the air its stability is remarkable. And added to the safety inbred in the design of the ship are Handley-Page wing slots which eliminate danger of spins and permit lower landing speed.

No plane is easier to land. And the split-axle undercarriage with its unusually wide track is sturdy, resilient and well-suited to cross-country touring when landings must often be made on rough fields.

Instruct in a Whittelsey Avian. Its economy of operation will save you money. Its inherent stability and flying qualities will hurry the solo flight.

## *To Dealers and Distributors*

When you fly or sell the Whittelsey Avian you have something to talk about. No other light plane has such a record of performance . . . or the equipment. National distribution of the Whittelsey Avian is being completed in the leading aviation centers of the country. Dealers and distributors are still being appointed. Write for further information concerning our sales plan. We will gladly send you the detailed story of the plane itself. The Whittelsey Manufacturing Company, Dept. G-4, Bridgeport, Conn.

RECORDS IT HOLDS . . . First solo flight, England to Australia; fastest time, England to Australia; longest flight ever made in a light aero-

plane; fastest time, England to India; first non-stop flight, London to Rome.

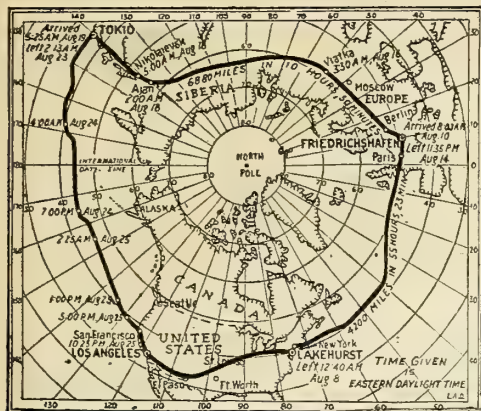
SPECIFICATIONS . . . *Power Plant:* Cirrus Mark III 95 H. P. air-cooled, four-cylinder in-line aircraft engine. Top overhaul at 200 flying hours. 20 miles to gal. of gas; . . . 500 miles to gal. of oil . . . *Speed:* Maximum, 102 m. p. h.; . . . cruising, 85 m. p. h.; . . . landing, 35 m. p. h. . . . *Ceiling:* 18000 feet . . . *Cruising Range:* 5 hours or 430 miles . . . *Weight:* Light, 875 lbs.; . . . Aerobatics: 1450 lbs.; . . . Top, 1600 lbs. . . . *Dimensions:* Wings span, 28 ft.; Width folded, 9½ ft. . . . *Height Overall:* 8½ ft. . . . *Length Overall:* 24 ft. . . . *Price:* Only \$4995, Flyaway or F. O. B., Bridgeport, Conn.



## WHITTELSLEY AVIAN



THE OUTSTANDING SPORT AND TRAINING PLANE OF THE WORLD



Courtesy of the New York Times



## "GRAF ZEPPELIN" GOES AROUND THE WORLD...

### *powered by Maybach Engines with Nickel Alloy Steel Parts...*

THE around-the-world flight of the famous "Graf Zeppelin" marks a new chapter in the history of aeronautics. Meeting successfully practically every kind of flying conditions, running continuously hour after hour at record breaking speeds—the long journey of the huge dirigible demonstrated again the wonderful endurance of Maybach engines and their dependable Nickel Alloy Steel parts.

Designers of the Maybach engines used in the "Graf Zeppelin" have taken advantage of the dependable uniformity of the mechanical properties of Nickel Alloy Steels—of the fact that the average, maximum and minimum values of Nickel Alloy Steels vary less from heat to heat than those of other commercial steels.

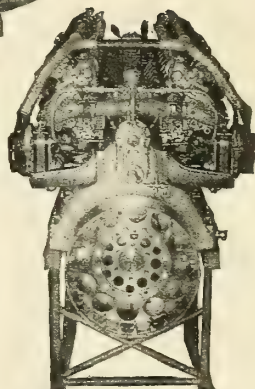
## Nickel FOR ALLOY STEEL

Send for "Buyers' Guide to Nickel Alloy Steel Products."

Right: Maybach 12-cylinder, 600 H.P. airship engine, same type as engine used in "Graf Zeppelin," mfd. by MAYBACH MOTOR CO., Friedrichshafen, Germany.

Below: Nickel Alloy Steel crankshaft of Maybach VL2 airship engine.

NICKEL ALLOY  
STEEL PARTS IN  
MAYBACH ENGINES:  
  
CRANKSHAFT  
CONNECTING RODS  
CAMSHAFTS  
VALVE TAPPETS  
And other Parts



Dependable materials  
are the best assurance of  
dependable performance

With this dependable uniformity established beyond question, practically all manufacturers of aircraft engines, both in America and Europe, have adopted Nickel Alloy Steels for highly stressed parts which must have utmost dependability without excessive weight.

Information on the properties and applications of Nickel Alloy Steels will be gladly furnished by our staff of engineers. You are invited to write for additional data.



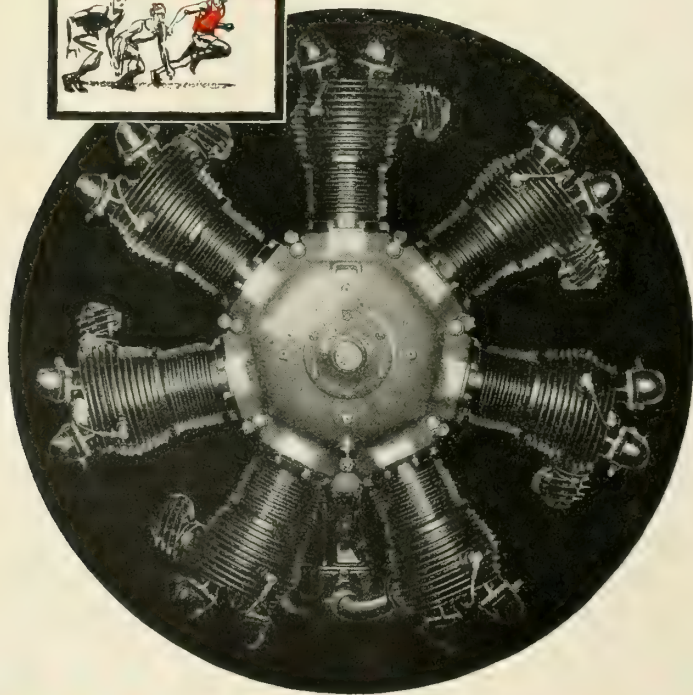


# Quick take-off

To the Pilot . . . "powered with an Axelson" . . . means quick take-off, lightning-like acceleration, fast climbing and the thrill of ample, unfaltering power. The new Axelson illustrated Catalog featuring the improved Axelson 7-cylinder radial Engine now available to those interested in aviation.

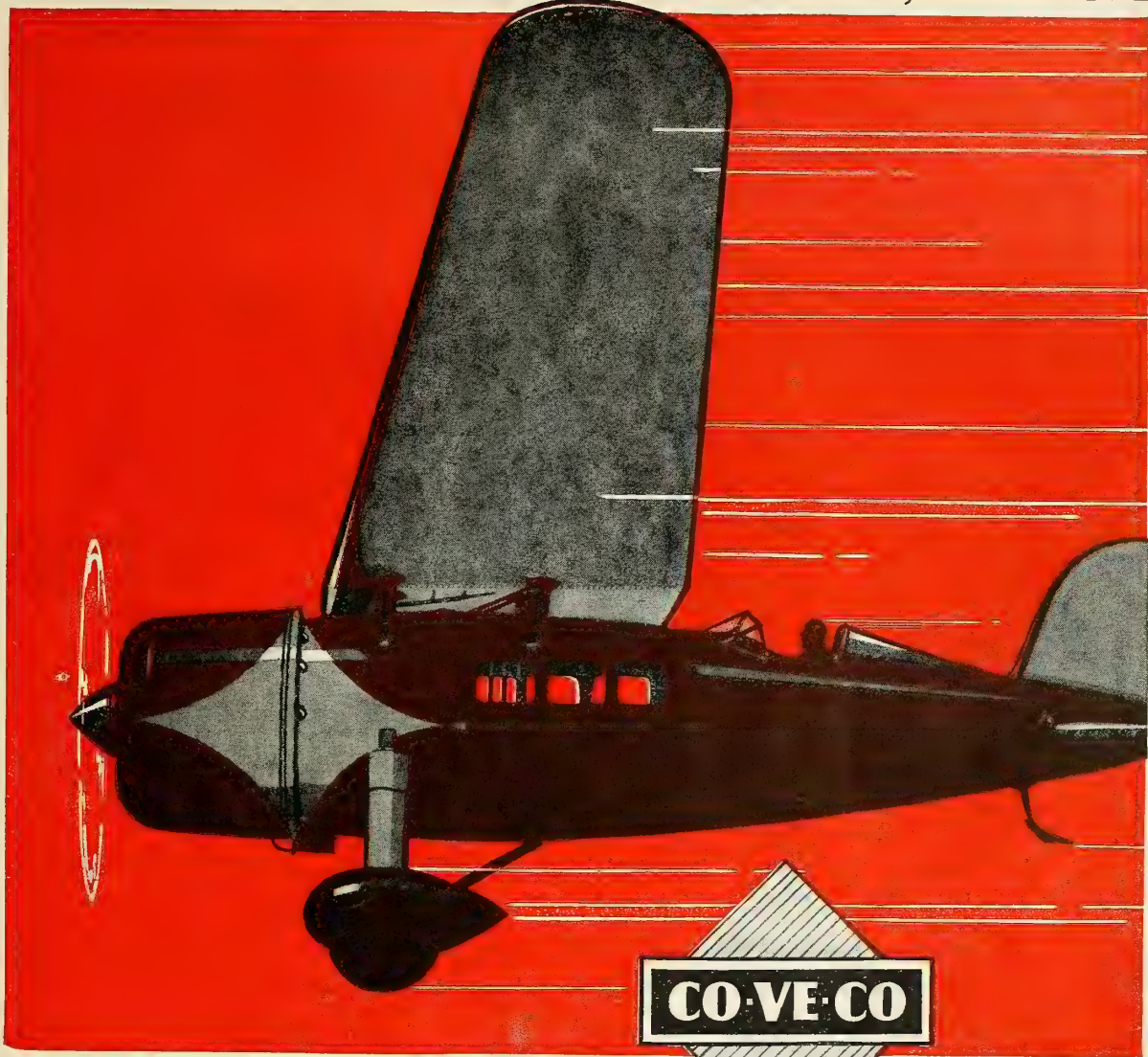
## Axelson Aircraft Engine Co.

Factory and General Offices:  
Cor. Randolph St., and Boyle Ave.  
Los Angeles, Calif.  
(P. O. Box 337)



# AXELSON AIRPLANE ENGINES

# LOCKHEED. SWIFT. STRONG, SURE.



## IS A CO-VE-CO USER

**B**EAUTY with Lockheed is only skin deep! Behind that superb outward beauty lies a stout, rugged construction possessing the laminated endurance of the everlasting Oregon forests!

And Lockheed gains much of its tremendous strength from Co-Ve-Co Aircraft Plywood, manufactured to the exacting precision requirements of the Lockheed Aircraft Company! Co-Ve-Co Aircraft Plywoods bring Lockheed the tremendous ingrained strength of the forests. An exclusive Co-Ve-Co production method permits Co-Ve-Co to precision-peel both Port

Orford Cedar and Sitka Spruce to your specifications, from logs just as they come from the forest. There is no "cooking" or steaming process to soften the wood and expand and burst fibres. Every square inch of Co-Ve-Co is uniform in cellular structure and strength. The full strength of the forest is always retained.

As an aircraft manufacturer or aircraft engineer you should be fully acquainted with the features of Co-Ve-Co Port Orford and Co-Ve-Co Sitka Spruce Aircraft Plywoods. A request will bring full technical data, and samples. Write.

### PORT ORFORD CEDAR PRODUCTS COMPANY

Marshfield, Oregon

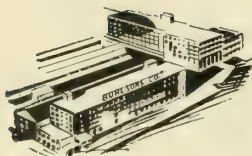
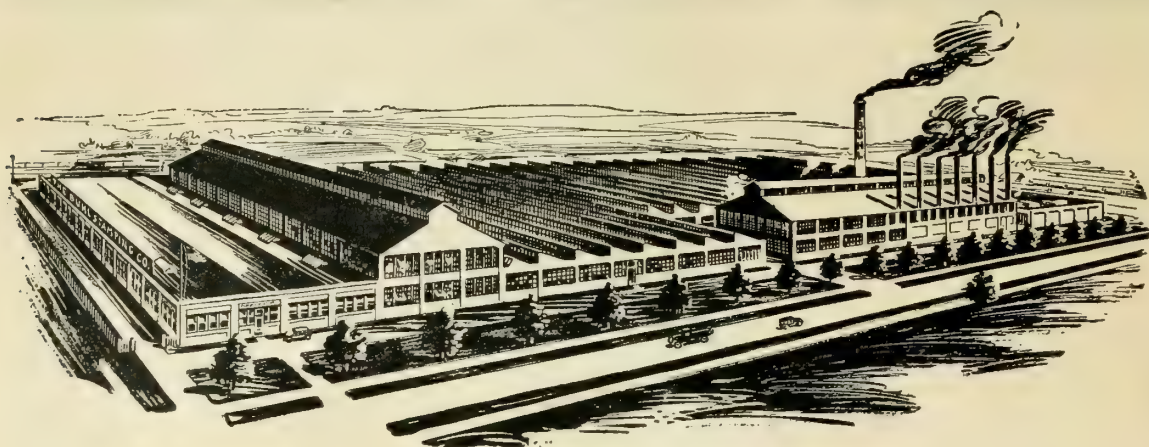
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**BUHL SONS  
COMPANY**  
DETROIT



**BUHL  
AIRCRAFT  
CO**  
MARYSVILLE

THE most successful executive is the one who delegates authority and responsibility in such a manner that he is confident of their prompt and proper execution. He rises upon the shoulders of those whom he has selected to serve him. So, too, with a commercial enterprise or industry. Its sources of supply must be dependable and reliable, capable of assuming responsibilities and accomplishing their allotted tasks intelligently, efficiently, economically, and within the scheduled time. That is why the Buhl Stamping Company has risen to the top of those who supply metal stampings to the aircraft industry. Its enviable record of forty years as an acknowledged leader in its field particularly fits this company to stand shoulder to shoulder with those who are foremost in the technical and commercial development of the airplane.

# BUHL

## STAMPING COMPANY

DETROIT, MICHIGAN

THE BUHL NAME has been identified with progressive industry since 1833. Buhl products today carry far more than



**BUHL  
BUILDING**  
DETROIT

the name alone—they preserve the priceless heritage of almost a century of manufacturing leadership and integrity.

...in a recent cross-country speed test  
*5 out of the first 9 planes*  
 Were  
*Waxed*

For speed! For beauty! For increased life! Daily more pilots, more private flyers, more commercial flying fleet owners are waxing the wings of their planes with Johnson's Airplane Wax.



1 That wax decreases skin friction, air drag, has been definitely proved by unbiased tests in the Guggenheim wind tunnel.

2 "So far as appearance is concerned, there is nothing which can compare with it. Applied directly over pigmented dope it gives the lustre of an enamel with all the advantages of a full doped surface," writes the Wisconsin Air College.

3 Wax forms a hard, dry, tough film that protects any wing finish from sun, wind, rain, and sleet.

4 Dirt and grease will neither stick to its mirror surface nor penetrate it. All soil

can be easily wiped from the waxed surface.

Mail the coupon for a free sample of Johnson's Airplane Wax, a report on the "skin friction" tests at the Guggenheim School of Aeronautics, and full information on Johnson's Aircraft Lacquers which are made by a new process to eliminate the cracking so common in airplane finishes.

**S. C. JOHNSON & SON**  
*Racine, Wisconsin*

S. C. JOHNSON & SON, *Racine, Wisconsin*  
 Please send me a free sample of Johnson's Airplane Wax, a reprint of the Guggenheim tests on skin friction, and information on Johnson's Aircraft Lacquers.

Name.....

Address.....

City..... State.....



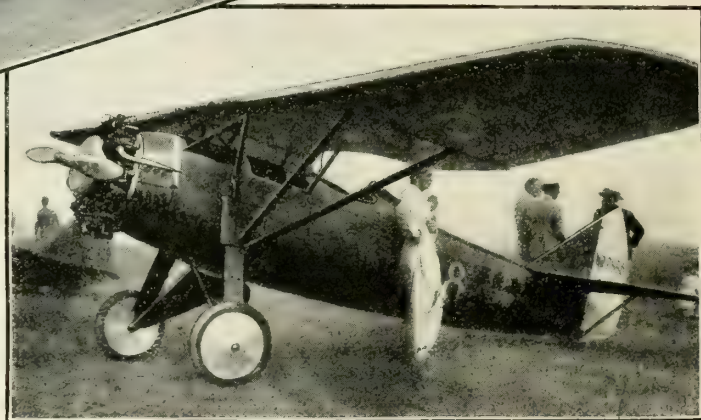
# WARNER "Scarab"



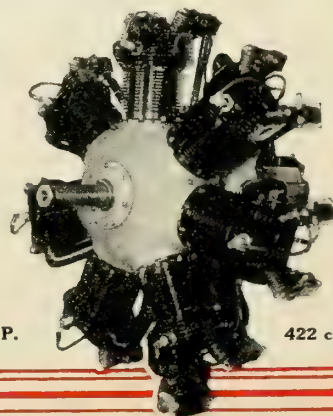
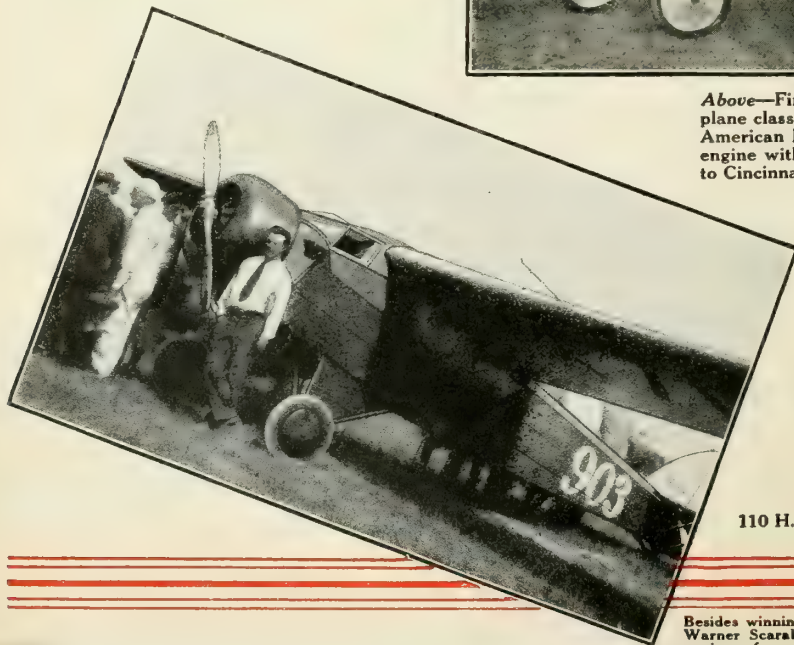
At left—First and Second in 50 mile National Air Race at Cleveland. (Event No. 9)

1. Vern Roberts in a Warner powered Monosport. (129 miles per hour)
2. R. T. Quinby in a Warner powered Monosport. (128 miles per hour)

Below—First in Miami to Cleveland Derby. Cabin plane class—Earl Rowland with the same Warner Engine and Cessna plane with which he won the 1928 National Air Derby. Completing 1483 miles in 12½ hours.



Above—First in Miami to Cleveland Derby. Open plane class (510 cubic inch)—Robert Dake in the American Moth monoplane, with same plane and engine with which he won the 1928 Los Angeles to Cincinnati Air Derby.



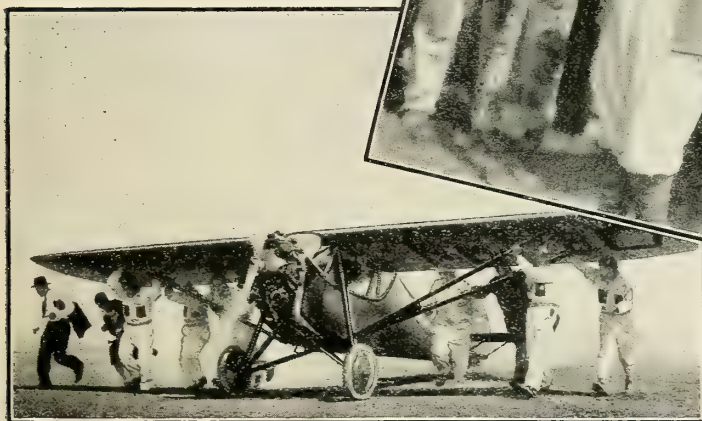
110 H. P.

422 cu. in.

Besides winning firsts in the events detailed on these pages, Warner Scarabs won firsts, seconds and thirds in races for engines of much greater power.

# ***Wins every event in its class*** **at NATIONAL AIR RACES!**

*Below*—First in Women's Derby—Santa Monica to Cleveland. (510 cu. in. class)—Mrs. Phoebe Omlie in Monosport. Winning valued Aerol Trophy with score of 289.3 points. Average speed 108 miles per hour.

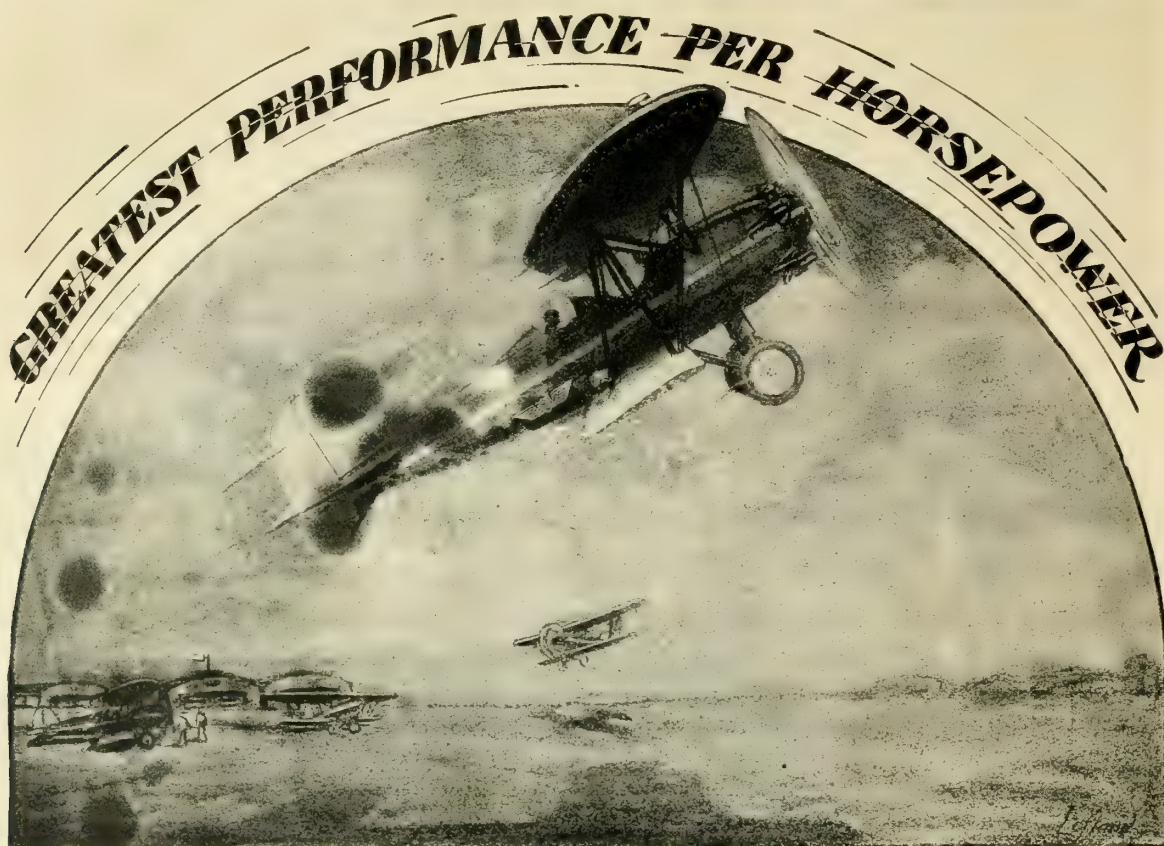


*Above*—Mrs. Omlie, first in Women's 50 mile National Air Race at Cleveland. (Event No. 1) Speed—112.38 miles per hour.

***Conclusively demonstrating that planes powered with WARNER "Scarab" are the fastest and most dependable in their power Class - -***

**WARNER AIRCRAFT CORPORATION, DETROIT, MICHIGAN**





Dual control with front unit quickly detachable for passenger carrying.

Landing gear split axle type with combination oleo rubber shock absorbers.

Perfection in aileron design. There has been no cheapening in simplifying.

Metal turtle-deck from front to rear allowing ease of internal inspection.

**T**O achieve the greatest of all performances in the popular-priced class, the Kinner has been introduced as standard BIRD equipment.

Low maintenance cost, uniform performance, the highest possible safety factor and its many other features, expected only in planes of the highest price, are winning more pilots for the BIRD every day. *Fly one today!*

The first entry to be tested in the Gugenheim Safety Contest now running.

Stability perfected to a degree allowing for fool-proof student training.

Chrome Molybdenum tubing throughout assuring highest safety factor 8 plus.

The wing design permits performance comparable to slotted wings. Will not spin.

**BRUNNER-WINKLE AIRCRAFT CORPORATION**  
17 Haverkamp St., Brooklyn, N. Y.



*Safety with Performance*

# You can buy on TIME!



\$107<sup>25</sup>....

Semi-monthly for ten months and \$1300 down buys this EAGLEROCK with Hisso "A" motor

## Prices Slashed on All Biplanes

EAGLEROCK biplane prices have been reduced \$250 on all models. Powered with government overhauled Hisso "A" motor the price is now \$3250 flyaway factory; Comet, \$5247; Challenger, \$5859; Wright J-6 165 h.p., \$5597; Kinner, \$3907; and less OX-5 motor and propeller, \$2000.

**P**OWERED with a government overhauled Hispano Suiza "A" 150 h.p. motor, Eagle-rock performance compares favorably with ships selling for twice as much. Flyaway factory price is \$3250. One of the best balanced and most easily controlled Eaglerocks in the line, it is by far the best seller we have. For training, cross country work and general commercial flying it has no equal in low first cost and economical operation.

In addition to the Hisso model, Alexander planes include two Bullet monoplane models and biplanes powered with most approved motors of any horsepower from 90 to 225. Here you will find an airplane suitable for almost every purpose at the price you wish to pay.

Any airplane in the complete Alexander line may be purchased under the liberal A. A. C.

time payment plan. You may pay 40 per cent of the list price down and the balance in as many as twenty semi-monthly payments. The finance charge which includes all interest is ten per cent of the unpaid balance. *No insurance is required.*

The complete utility and price range of Alexander airplanes affords excellent sales opportunities. Write for information on our plan of furnishing salesmen an airplane and sales helps.



403 Alexander Industries Bldg.  
Colorado Springs, Colorado

# ALEXANDER EAGLEROCK

Say you saw it in AERO DIGEST



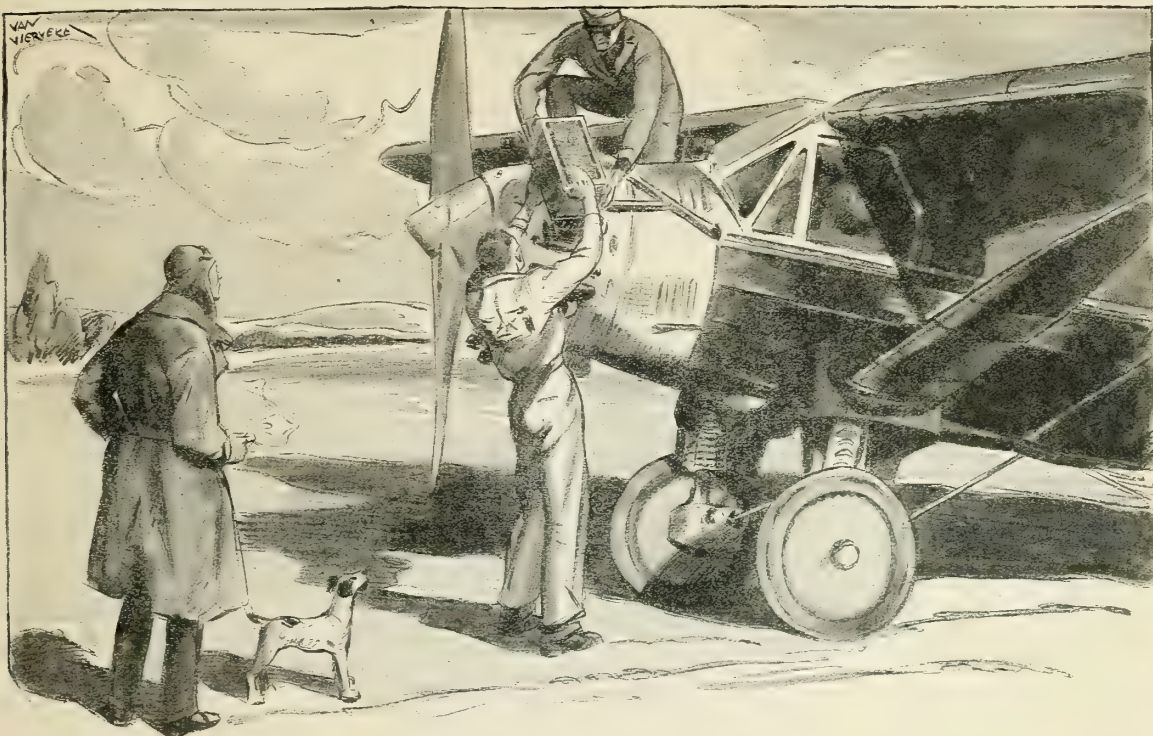
The graphic features a large, stylized, grey engine block with a central circular port and various bolts, set against a dark background. A red and white checkered wing, representing a Kinner airplane, is positioned diagonally across the lower half of the engine. A small, red and white biplane is shown in flight to the right of the wing. The word "SPEED" is written in large, red, serif capital letters at the top. A thin white line curves around the left side of the engine. At the bottom, the word "KINNER" is written in large, white, sans-serif capital letters on a red background.

*SPEED*

**KINNER**

**KINNER AIRPLANE AND MOTOR CORP.**  
**GLENDAL, CALIF.**

**5 CYLINDER -- 100 HORSEPOWER**



## CANS OF INSURANCE

**T**HE red and black cans of -TP- Aero Motor Lubricating Oil contain the best insurance against the many kinds of engine trouble caused by faulty lubrication. This insurance makes flying safer.

-TP- Oils are new—the latest development in scientific lubrication. They have been tested and approved by leading manufacturers of airplane engines and by many leading pilots. They are straight-run oils, not blended or compounded, produced from pure, paraffine-base crude by a process for which patents are pending.

This process has marked ad-

vantages over other methods. It removes all the paraffine wax, while preserving all the lubricating bodies in the crude. Elimination of the wax is responsible for its low cold test.

In terms of performance this means uniform viscosity at all working temperatures, minimum carbon deposit and ignition trouble from fouled spark plugs, easy cold priming, immediate oil pressure, perfect lubrication winter and summer, on the ground or at high altitudes—a maximum of safe flying hours.

A handsome, practical Pilot's Log Book sent free on request.

TEXAS PACIFIC COAL AND OIL COMPANY  
FORT WORTH, TEXAS  
New York    St. Louis    Los Angeles

**-TP- AERO MOTOR LUBRICATING OIL**

REG. U. S. PAT. OFF.

-TP- Aero  
Valve Spring  
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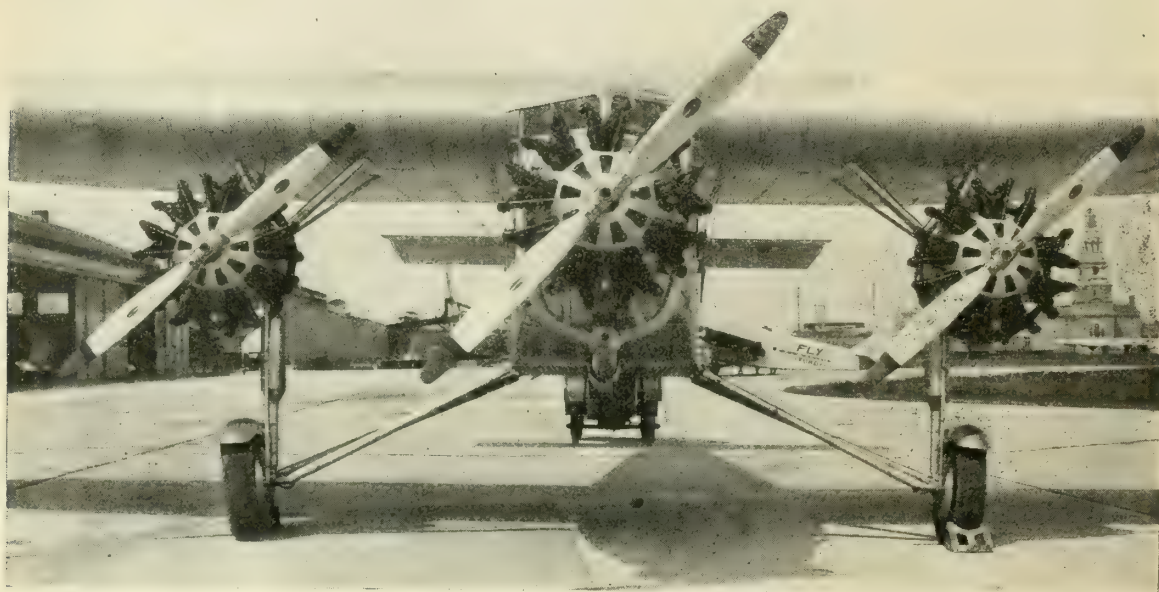


Also  
-TP- Aero  
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*Span 77 ft. 10 ins. Maximum speed, 133 M.P.H. Maximum radius of action (standard equipped) 5 to 6 hours. Ceiling, 18,000 ft. Weight empty, 7500 lbs. Disposable load, 6000 lbs. Power load, 3 engines, 10.6 lbs. per H.P.; 2 engines, 15.9. Cabin accommodates 14 passengers, pilot and mechanic. Construction: ALL-METAL throughout, exposed surfaces Alclad alloy. Power: 3 Pratt & Whitney Wasps, totaling 1275 H.P. Price, complete with standard equipment including instruments, seats, toilet, etc., fly-away Dearborn, \$55,000. (Prices and specifications subject to change without notice.)*

Volume 15  
No. 4

# AERO DIGEST

OCTOBER  
1929

THE MAGAZINE OF THE AIR

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*The Graf Zeppelin over lower New York City after its trip around the world, accomplished in 21 days*

# AROUND THE WORLD BY AIRSHIP

THE 'round-the-world flight of the *Graf Zeppelin*, which started and ended at Lake-

By Wilbur R. Hanawalt

hurst, New Jersey, and the itinerary of which lay across the Atlantic, Europe, Asia, the Pacific and the United States, marked the start of a new and potent phase of international understanding and coöperation. For its successful completion, the flight required the unselfish coöperation of all those nations in the northern hemisphere over which it passed. This great aeronautical achievement aroused the friendly admiration of all peoples of the world, but especially those of the countries in which it made stops. It centered the attention and enlisted the sympathies of the peoples of the earth on an endeavor that erased international lines and international differences.

Dr. Hugo Eckener, commander of the *Graf Zeppelin*, took off from Lakehurst, New Jersey, on August 8th on the world flight, after the ship had received careful preparation for the flight. Its 3,708,000 cubic feet of hydrogen gas was checked, the hull over its entire 776-foot length was inspected carefully, as were the five engines which, with a total of 2,550 horsepower, gave the craft its speed. There were sixty-one persons aboard—twenty passengers and a crew of forty-one. Among the passengers was Commander Charles E. Rosendahl, commander of the Naval Air Station at Lakehurst. The crossing of the Atlantic was made in a new record time; the ship reached the coast of Europe in 44 hours, and her home base at Friedrichshafen in 55½ hours, having bettered her former time of 72 hours, and having covered a distance of 4,200 miles. On this first leg of the journey, the *Graf Zeppelin* headed straight east for the first 1,000 miles to evade a storm centered in Canada, then had favorable weather on the remainder of the crossing with a 40-mile tail wind which increased the speed of the craft to 105 miles an hour.

In Germany the *Graf* was again checked and the engines, after the installation of a valve spring and spark plug, were in condition to continue the flight. On August 15th the ship started on her second hop, Friedrichshafen to Tokio, a distance of 7,000 miles over territory unmapped and unexplored. The estimated time for the distance to Tokio was 120 hours, and the longest former flight of the *Zeppelin* had been 111 hours. There was no meteorological or weather report available on the vast distances of the Siberian waste, and although all European observers and two Russian organizations, the Osoaviakim and the Soviet Radio Association, arranging to work in day and night shifts to keep in touch with the *Zeppelin*, contributed to Dr. Eckener's knowledge of weather possibilities over the territory, his data was incomplete.

The craft loaded supplies for 150 hours and set out to fly over Berlin, Danzig, the steppes, the Siberian tundra and the Asiatic mountains. The rather sketchy weather map made from insufficient data by Dr. Eckener and Dr. Seilkopf, the weather expert on board, turned out to be correct. The weather on the flight was favorable; fortune and skill aided the German commander. With favoring weather the ship maintained an average speed of about 64 miles an hour on the long flight. Over the last 600 miles

of her journey the dirigible ran into a fog which required a change in her course. After leav-

ing Siberia behind, she flew down the west coast of Hokkaido, the northernmost of the main islands of the Japanese group, and after covering the 6,955-mile flight in 101 hours and 53 minutes, arrived in Tokio on August 19th.

The people of Japan welcomed the international adventurer with an enthusiasm equal to that which the western hemisphere had displayed; the factories of the nation blasted their whistles in welcome, the crowds cheered, the band played the German national anthem, and eight planes escorted the *Zeppelin* to the Kasumigaura Airport, forty miles northeast of Tokio. The passengers and crew of the ship were feted by the Japanese officials. The inspection of the engines again showed that they had withstood the rigors of the flight across the Atlantic, Europe and Asia without impairing their efficiency. One hundred Japanese naval mechanics worked on the ship while searchlights and all facilities of the Japanese navy aided the preparations of the craft for the continuation of its voyage; 950,000 cubic feet of hydrogen and pyrofax combined for fuel was loaded, and the lifting gas of the ship increased.

Dr. Eckener plotted his next flight straight for Los Angeles, spurning the possibility of remaining near land by following the course over the Aleutian Islands. The Japanese weather bureau made a complete survey of the whole western Pacific area, showing a favorable report. The ship's route lay over the great circle, 200 miles south of land, and along the steamer lanes from Yokohama to Seattle and Vancouver. Shortly after the take-off on August 23, storm areas were reported northeast of Japan over the Aleutian Islands and the Bering Sea, creating a hazard along the great circle route. Three hours out of Japan the storm hit the airship, and without a moment's hesitation, the *Graf Zeppelin's* commander ordered a change in direction straight into the spaces of the Pacific along a route 500 miles to the south of the intended course, to evade the storm area. The ship encountered wind and rain, but she rode through the squall into clear weather. Reports from the United States Weather Bureau aided the commander in shifting his course to a favorable route. All facilities of the American Army and Navy, by official order, were utilized for sending meteorological communications to the *Graf Zeppelin* on her Pacific crossing. Schedules were made for communication every four hours. The *Zeppelin* passed over the Golden Gate at San Francisco on August 25th, and after circling that city, proceeded to Los Angeles where she completed the third section of her 'round-the-world trip on August 26th, having covered 5,800 miles in 78 hours and 58 minutes.

Two thousand and four hundred miles of airline distance remained for the completion of the flight. The Transcontinental Air Transport offered the use of its lighted airway and meteorological services for the flight across the United States. Seven of the crew were sent by plane to New York in order that the ship might carry more mail, and to facilitate the

(Continued on page 261)





# WORLD FLIGHTS MARK PROGRESS

IN times not far in the future men will fly around the world, speedily, safely and comfortably, in sharp contrast to the dangers and hardships which marked the first 'round-the-world flight climaxing the dream of centuries. That history making flight, so typical of American enterprise, may properly be regarded as the forerunner of an air transport service linking the nations of the world from India's coral strand to Greenland's icy mountains.

It was altogether fitting that Americans should be the first to fly around the world. Orville and Wilbur Wright had solved the age-old desire to fly. Their first flight, made twenty-one years before we flew around the world in 1924, took their plane only a few feet off the ground for a distance of 120 feet, and the flight lasted only twelve seconds. Their queer looking contraption weighed only 850 pounds, and its engine developed but twelve horsepower.

I am now touring the country piloting an eighteen-passenger Boeing transport, the three Hornet engines of which, with their 1,575 horsepower, can drive a full load of eight and three-quarter tons through the air at a high speed of 135 miles an hour. That contrast is typical of what has happened in a few years.

After the excitement of the Wright brothers first flights, aviation lagged very noticeably. Then suddenly came the World War. Aeronautically speaking, things started to happen. The airplane found its place in the rising sun of human endeavor. The industry was galvanized into action.

After the war various nations realized the possibilities of the airplane, not only as a weapon of war, but as a commercial utility. In the United States interest in aeronautics was largely centered in the Army and Navy. The Army Air Corps conducted flights to stimulate interest in flying. Various planes were made for special flights, among them the one around the world. Our Air Corps began the organization of the world flight in 1923, and a year later we carried it to a successful conclusion. Various nations had planned and tried to make this flight, but failed, including fliers of Great Britain, France, Italy, Portugal and the Argentine.

I shall review briefly our experiences on the flight, showing conditions as they existed five years ago contrasted with equipment and flying facilities today.

The planes which we flew had a wing span of fifty feet, each could carry 475 gallons of gasoline and thirty gallons of oil. They had a 410 horsepower engine. The pilot and his assistant sat exposed in open cockpits.

Four planes began the flight. If disaster came, at least one would stand a good chance of making the circuit. Two actually did. Since airplanes had never visited many parts of the world we were not always certain of supplies, or of weather reports. Consequently, the United States Government pressed its various branches of service into supply activities. In view of the fact that this has proved the only successful round-the-world flight of heavier-than-air craft, this preparatory program has more than vindicated

By Lieut. Erik Nelson

*'Round-the World Flier (1924)*

*Sales Manager, Boeing Airplane Company*



Lieut. Nelson, pilot of the round-the-world plane, "New Orleans"

itself. Pilots are no better than their equipment and supplies.

When we took off March 18, 1924, from Santa Monica, California, the expedition consisted of four planes and eight men; namely, Major Martin and Sergeant Harvey in the *Seattle*; Lieutenant Smith and Sergeant Turner, who was later replaced by Lieutenant Arnold, in the *Chicago*; Lieutenant Wade and Sergeant Ogden in the *Boston*; and the *New Orleans*, which I piloted, with my pal Lieutenant Jack Harding as my assistant.

Two of these planes met with misfortune; the *Seattle* crashing into an Alaskan mountain, and the *Boston* sank in the north Atlantic after flying four-fifths of the distance around the world. Fortunately, the men with these planes escaped injury, although they suffered extreme hardships before being rescued.

On that flight we were our own pilots, mechanics, repair men, refueling forces, weather diagnosticians, and handy men of all trades. Our planes had to be both land and seaplanes.

\* \* \* \*

THE narrative of the flight from Seattle to Japan via the Alaskan coast is one of battling with rain, sleet, fog, blizzards and angry seas which frequently threatened to demolish our planes when we anchored in what we hoped would be a sheltered bay. Part of our trip westward along the Aleutian Island was made in weather too severe for birds to venture forth, and frequently we flew over angry seas which forced steamers to seek shelter. Often we had to fly so close to the water, because of snow and blizzards, that had a cliff jutted out we would have crashed headlong. With a sort of "misery likes company" idea we huddled together as we flew, until the storm grew so thick we were in danger of running into one another.

Our course took us to desolate, out of the way spots, where there were no facilities for overhauling our planes, and where we were left to our own resources among people who had never seen, and in some places never heard of, an airplane. In one tiny Aleutian hamlet they called us "Thunder Birds", and ran in terror as we glided into the harbor. Dog tired, hungry, sopping wet, and teeth chattering with cold, we would fly the allotted lap and then work all night to save the planes in the floating ice and waves and to get them into shape for the next leg of the 28,000-mile flight.

Historians rank our flight across the Bering Sea and the Pacific Ocean as an outstanding episode in the history of flying. When we reached the Kurile Islands, Japan, in May, 1924, ours was the honor of being the first to cross the Pacific by air. The naval seaplane, NC-4, had been the first plane to fly across the Atlantic Ocean. Thus the United States through its Navy and Army, has the honor of having led in the crossing of both oceans.

When we reached Japan we were fearful that fliers of some other nation might beat us around the world. One French flight had failed at Shanghai, China. The second British dash failed at Amoy, but plucky Major MacLaren, with the aid of our party

(Continued on page 254)



The Whirlwind-powered Buhl Airsedan, "Spokane Sun God," in which Nick B. Mamer (inset, right) and Art Walker (inset, left) made a non-stop round trip transcontinental flight by means of refueling, and covered a distance of approximately 7,000 miles in 120 hours.

## INTRODUCING AN ADVANCED PHASE OF ENDURANCE FLYING

**F**OLLOWING the numerous airport refueling flights that had been made since the *Question Mark* established her memorable record early this year, it remained for someone to prove the practical application of endurance flying.

With this thought in mind, and backed by a group of Spokane business men, we began preparation for a transcontinental round-trip non-stop refueling flight.

The route selected was from Spokane, Washington, to San Francisco, Salt Lake, Cheyenne, Omaha, Chicago, Cleveland and New York, returning via Cleveland, Chicago, St. Paul, thence over the proposed northern airway through the Dakotas and Montana to Spokane, thus completing the round-trip ocean to ocean circuit.

Upon hearing of our plans, the Buhl Aircraft Company offered a new model six-place Buhl Airsedan. The Wright Aeronautical Corporation supplied us with a J-6 Whirlwind 300 horsepower engine, and arrangements were made with the Texas Oil Company to supply complete service for the entire flight. Our own company, the Mamer Air Transport at the Spokane airport, Felts Field, prepared two refueling planes, a J-5 powered Buhl Airsedan, and a Ryan with a J-5 Whirlwind, each with a 100-gallon tank capacity. These ships were to be piloted by R. M. Wilson and Verne Bookwalter, respectively. The Aviation Accessories Corporation of San Francisco arranged to have a Travel Air J-5 monoplane refuel us over Mills Field, San Francisco, the first scheduled refueling point. This ship was manned by Donald Templeton, pilot, and James M. Warner, who was radio operator on the *Southern Cross*. This crew had had previous experience with refueling, having made numerous contacts with the *San Franciscan*, endurance plane.

The Buhl and the Ryan refueling planes were sent to Cheyenne, Wyoming. Plans for refueling at the Eastern end were arranged by Frank Hawks of the Texas Oil Company, who provided two Curtiss Robin refueling ships. One was stationed at Cleveland, manned by Dan Robertson, pilot, and Frank Buchanan, an employee of the Texas Company. The New York refueler was to be none other

By Nick B. Mamer  
Pilot of the Buhl "Spokane Sun God"  
and Vice President of Mamer Air Transport

than the ship and crew which kept the *St. Louis Robin* up 420 hours, R. W. Wassall, pilot, and "Shorty" Chaffee.

The time of departure was set at Thursday, August 15th, 6 p. m., Pacific Standard Time. Art Walker, an employee of our company, was selected as co-pilot.

The stock model Buhl Airsedan, with its overhauled Wright J-6 engine, was delivered to us on August 12th, a few days before the scheduled start. A 200-gallon tank was installed in the cabin, and a hatch cut in the roof, through which the refueling was done. A ten-gallon oil tank was provided, with a quick dump valve operated from the cockpit for oil changing. The ceiling of the cabin was covered with transparent celluloid to give the pilot upward visibility to assist in the refueling operations. A wobble pump was installed to pump the gas from the fuselage tank to the 120-gallon wing tank. The total gas capacity was 320 gallons.

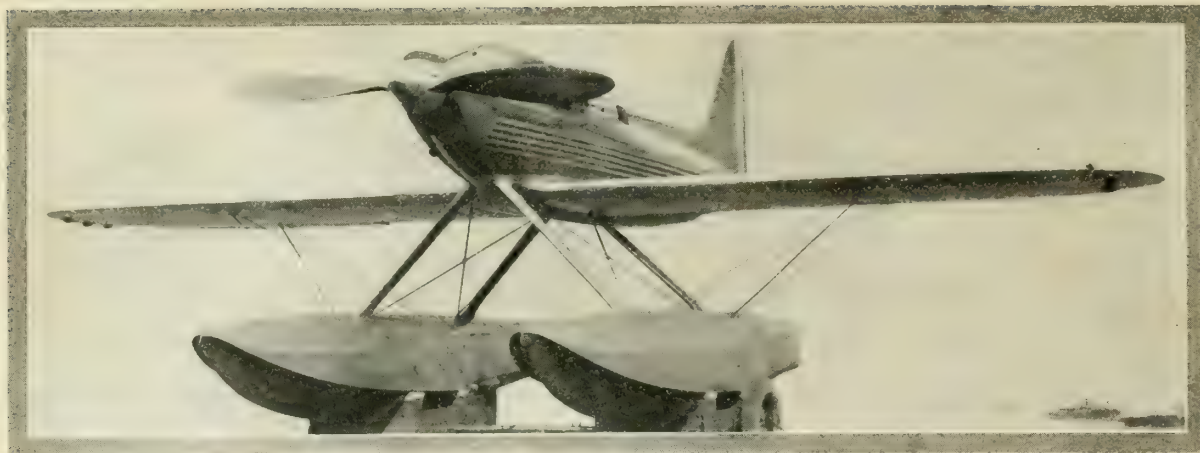
A radio reception set was also installed, and on the floor of the cabin was arranged a mattress extending back into the rear of the fuselage for rest purposes. The ship was equipped with single controls, earth inductor compass and the usual instruments for this kind of flight. Specially prepared message droppers were carried for plane-to-ground communication. We took parachutes along but seldom wore them because they made it awkward to move around. Everything was in readiness at the appointed time.

The ship took off easily with its 800-pound overload, at exactly 6 p. m., August 15th. Darkness overtook us in a few hours, and inasmuch as the country was covered with a dense blanket of forest fire smoke haze, we climbed to 10,000 feet and set a straight course over the mountains for the Golden Gate. Nine hours later the lights of San Francisco were visible through the light mist which was drifting in from the ocean.

After circling Mills Field for two hours, waiting for daylight, we met the *Californian*, our refueler, over Dunbarton Bridge at 4,000 feet, the appointed place. In two contacts, which were easily made, we took on 180 gallons of gas and 10 gallons of oil.

(Continued on page 280)





*The winning British entry in the 1929 Schneider Trophy Race, at Calshot, England; the Supermarine S-6 powered with a Rolls-Royce engine.*

## NOTES ON THE 1929 SCHNEIDER TROPHY RACE

By Kent Sagendorph

RECOGNIZED as the most important seaplane event in international aviation and perhaps the most practical of all airplane races, the Schneider Trophy Race has given the world a demonstration of seaplane progress and development for the past sixteen years. And the influence of the Schneider Trophy has contributed a great deal toward that development. It has provided lighter, but more powerful engines; new contributions to the science of speed in flight, new additions to modern knowledge of airplane construction.

When the first Schneider Trophy contest was organized in 1913, nothing of the magnitude of the recent Schneider race could have been visualized. Jacques Schneider was a genial, middle-aged French engineer and amateur aviator who had a strong liking for seaplanes. He felt that public indifference was strangling seaplane development. There was very little interest in the subject in 1912, and he decided something ought to be done in order to make seaplanes practical. Consequently, at a banquet of the Aero Club de France in Paris on December 5, 1912, he announced his donation of the Schneider Trophy, to be competed for annually among seaplanes representing all nations.

He probably believed that if he could induce a few people to come and watch a seaplane race, a little public attention might be attracted to seaplanes and their standards of efficiency raised. Two factors helped support this theory. One was that he offered 25,000 francs to the first three annual winners of the trophy, to help them build more practical en-

tries. The other was that he had doubts about the practical value of seaplanes, in that he inserted rules requiring entries to be navigable.

The Aero Club de France sponsored the first contest, held at Monaco in the summer of 1913. Prevost, pride of France, flew his new Deperdussin twin-float monoplane in winning time, credited with an official speed of 45.75 miles per hour.

Sixteen years of Schneider competition have changed the seaplane situation completely. Today, under the influence of the Schneider Trophy, seaplanes hold the world's speed record and call forth the highest expressions of mechanical skill from engine builders and airplane designers. Schneider Trophy winners travel faster than any other human beings. And this year perhaps a greater number of persons gathered to see the Schneider race than ever witnessed any single activity in recent history.

The last previous competition was held in Venice in 1927, and was won by Flight Lieut. S. N. Webster, representing Great Britain, which victory resulted in Britain's defending the trophy this year. The Royal Aero Club organized the contest, conferred with the F. A. I. (Federation Aeronautique Internationale) concerning rules and with the British Air Ministry concerning the course.

Originally, ten machines were entered: one by America, three by France, three by Italy and three by England. France announced some weeks before the contest that her entries would not be ready by the time the race was to be held, and that she, therefore, was not to be represented. Italy had the mis-



*The Italian Schneider Trophy team and one of the Macchi racers*



fortune to lose several of the racing seaplanes built for this year's contest and her position was weakened by the death of Captain Motta, acknowledged to be Italy's best racing pilot on the team, during tests held on Lake Memi a few weeks before the contest. The lone American entry, Lieut. Alford J. Williams, resorted to desperate expedients to get his Mercury special racer prepared and flight-tested in time for the races, but without success. The Navy withdrew its coöperation and Williams was forced to remain at home.

These developments strengthened England's chances of victory, and for a time it appeared as if she would have no foreign competition at all. France was out—the United States had no entry, and Italy had lost her best pilot and several specially-built machines. However, Italy's Under-Secretary for Aviation, Balbo, announced that she would participate in the 1929 Schneider Trophy Race as a "Sporting Gesture"; without much hope of

victory but merely to make the race possible. Italy sent urgent requests to England to have the race postponed, in order to give her time to complete and test her entries, which the Britishers declined.

There was quite a good deal of international comment on the position of England in the matter of postponement, and French papers pointed out that, were the event postponed two weeks or longer, the French entries might be completed. Italy explained that the sudden death of Captain Motta had disorganized the whole racing team, and that additional time was needed for the other members to familiarize themselves with the new machines then under construction.

England replied that the rules did not give the nation which sponsored the contest permission to postpone the date of the race, except from day to day because of adverse weather. As it turned out, England's position was entirely correct, inasmuch as the British weather bureau had been laboring for a year past to predict accurately the condition of the weather during the Schneider race, and the date announced was ideal for fast flying. Immediately after the races were held, the inevitable fall haze appeared on the waters of the Solent and Spithead, rendering racing impossible. When travel-

ing at over 300 miles per hour, a pilot must be able to see a pylon five miles away in order to make his turn correctly. If the pylon is obscured by fog, haze or other atmospheric conditions, no race can be held because the pilots cannot see the pylons in time to turn around them. Even at a distance of five miles, the pilot has only a few seconds to bank his ship and make the turn.

Italy finally accepted the original date of September 7th, and gathered her racing team together for the trip to England. Machines which were available, although un-

tested, were hurriedly crated and shipped to Calshot, where tests began, and where one of the Italian machines took the water for the first time.

The Italian team arrived in London and was motored to Calshot, arriving as the British officers were at lunch in their officers' mess. The party consisted of Colonel Bernasconi, Lieutenants Giovanni Monti, Remo

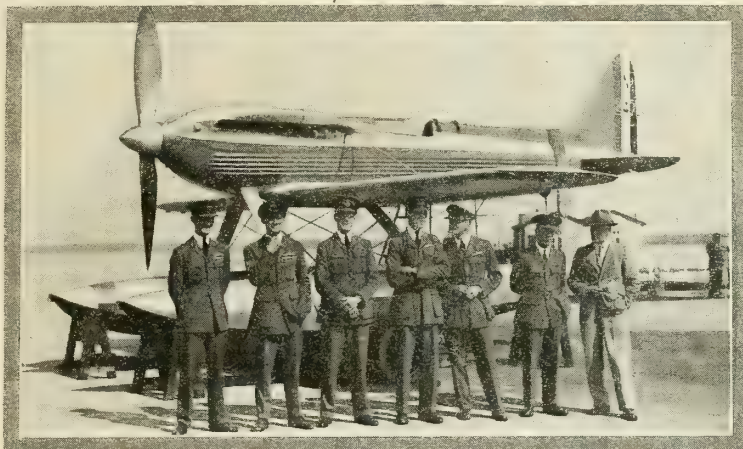
Cadrigher; Warrant Officer Tomaso Dal Molin, Sergeant-Major Francesco Agello, and a doctor. The colonel gave a brief talk, saying that they had come to England in hope, but that the hope rested on their pilots rather than on their machines. The pilots, meanwhile, stood around the mess hall looking longingly at the well-stocked tables, but the doctor shook a warning finger and not so much as a cup of coffee was permitted the well-trained men.

To digress a moment, the Italian team was selected and trained in the same manner as a team of championship swimmers, or boxers. In the first place, some fifty good pilots were sent to Turin for preliminary examination, and from these about twenty were selected for further tests on fast seaplanes. Finally the number was cut down to the six who appeared in the Cal-

shot mess-hall. The doctor dogged each man's footsteps constantly; no man could drink coffee for fear it might keep him from sleeping, special cooks from sunny Italy were imported to prepare spaghetti in just the right manner, and no man on the Italian team was allowed any social visits with Calshot girls who might keep them up late.

The British team is an

(Continued on page 268)



Members of the High-Speed Flight from which the English team was chosen.



Fueling the British Gloster-Napier during preparations for the race



# THE WHEREFORE OF WAR

## A WAR in the air has been held up as a threat to mankind

### PART IV—PLANES, THE WEAPON; OIL, THE SAFEGUARD

By

James Warner Bellah

for over twenty years, four and a half of which mankind spent practising for the ultimate spectacle, yet to be produced, but nevertheless constantly and conscientiously in rehearsal. Our next war will be a war in the air to a greater extent than the last one was; and after it, we will be one step nearer the millenium.

Mention war in the air and howls go up on all sides. Let us get a picture of it before we yell. Man's aim in the actual waging of his wars has been greater mobility always. From his two feet, he leapt to a horse, from his horse, he climbed into his automobile and from that he left the ground entirely. On water, he first sailed with the wind, using the oars of slaves to give him mobility in a calm. Next he put steam engines in his hulls. To protect them, he armored the hulls. Here he found that he had to split the difference; for, if the armor was heavy enough to protect, it was too heavy to give him mobility. As a result, he invented the torpedo boat and the torpedo boat destroyer. After which, he left the water entirely,—or should have.

War, reduced to its common denominator, will probably always be, as General Summerall so aptly put it once, "a man with a weapon in his hand, moving along the ground to make another man with a weapon in *his* hand move elsewhere"; for in the end, the possession of ground determines the victor until the war debt is figured out.

The airplane is man's newest answer to the question of mobility. And the axiom of its successful use is that it can only be combatted successfully by another airplane, excepting of course that 55,021st archie shot that always plunks home on the sleeve targets during the anti-aircraft tests, to bring gladness and joy to the heart of the brigadier commanding the archie batteries.

Personally, we don't give a tinker's damn, or any other kind, whether the airplane is an auxiliary weapon of the Fleet or of the Army, or whether the Fleet and the Army are auxiliaries of the airplane. Which is more important, the horse or the cart? Holding your right thumb in your left hand, can you grab it with your right hand before it slips out of the grasp of your left? Can you turn out the light and jump into bed before the room gets dark?

No—the question is not who insulted the piccolo player's ancestry—the question is how many airplanes are you going to have in the next war and how good will they be.

But that is only the start of it. It is taken for granted by everyone who has brought an intelligent eye to the aerial development of the past decade that the next war will see the "sky black with planes" in the following specific ways.

- (1) There will be trans-oceanic raids.
- (2) Cities will be rendered completely untenable.
- (3) Troop service of supply will be unbelievably difficult.
- (4) Far distant (and by that we mean half the world away or farther) sources of munition supply will be cut off.

With the result that the destruction of man power will cease to be the personal, physical aim of tactics and will become a highly scientific and indirect art.

That is what war in the air means. Man will be killed

at his source. The cities behind him with their mothers and their children will go. Young recruits in base

camps will cease to be, before they have learned to mark time to the sergeant's satisfaction. Why shoot a man in the stomach when you can starve a million men by lacing the

wheat fields of Kansas with incendiary bombs?

I see some Admiral in the back row frothing at the mouth, and I hear Major General Bluffanbounce's arteries snapping like fire crackers.

Chorus: Cavalry did the same thing for hundreds of years, there has always been guerilla warfare, what about blockade runners—that's all the airplane is—a fringe of annoying insanity around the real art movement of war.

Granted, Gentlemen, but infantry and artillery defeated cavalry, flanking parties and rear guards drove off guerillas, ships caught blockade runners, for they were defense measures working in the same element. You wouldn't order a regiment of infantry to swim after a blockade runner or send a battleship to break up a cavalry raid, and so help us all, you will have to learn that a man on a step ladder with a book of statistics can't bring down a bomber.

Get the picture. Planes to destroy armies and fleets at their source, which is far simpler than the direct methods of old. Planes to fight those planes and not let them do their job. Result—war in the air. Who cares about the rest? That is what is meant by war in the air. That is your next war.

\* \* \* \*

WE have discussed previously the causes that bring wars to pass; we have pictured the actual spectacle. There is only one consideration left to us. What stops wars?

Past wars have been stopped by strategy and clean cut victories in the field. The last war was stopped by starvation. The next war will be stopped by oil.

Oil is the life blood of peace and war today. Civilization has become so completely mechanized in the past three decades that without oil it would crumble in less than a week. Nothing—consider it—would work! Automobiles, radios, elevators, trains, water supply, pocket lighters, telephones, electric lights, clocks, moving picture machines, ocean liners, airplanes—nothing.

In 1917, De la Trameyre points out, had the United States held out for peace thirty more days, France would have collapsed for want of gasoline and oil. Her reserve supply was down to its last month. A shock to consider such a thing, but true.

Consider then with the tremendous advances in motorizing armies that have come upon us and will continue to come upon us, how much greater oil will become the most important sinew of war. It's possession, or it's lack, will mean victory or defeat. Man's ingenuity and courage are much the same regardless of race or nationality. He can build and fly air fleets the world over. But those fleets will fly and fight as long as their tanks are full, and only that long. Afterwards—finish.

The ultimate lack of oil will stop the next war. And by the same token, the possession of oil reserves will act automatically as a safeguard against wars starting. No one will attack a country that controls large oil resources except to get those resources—which again becomes the cart and horse question.

(Continued on page 276)

IN approximately the year 1790, J. P. Blanchard, a Frenchman, first used a parachute in conjunction with a balloon. An unfortunate, and unwilling, stray dog was the first jumper, and he had to be thrown

over the side of the balloon basket by the scruff of the neck. The tests were considered successful, and three years later Blanchard essayed a jump. Because his rate of descent, however, was a trifle high, he suffered a broken leg.

On October 22nd, 1797, Andre Jacques Garnerin made the first entirely successful parachute drop at Paris. His apparatus oscillated so violently from side to side that it was thought for a while that he would surely be thrown out of the basket, which at that time was always suspended from a parachute.

Leonardo da Vinci discussed the principles of the parachute, and mention is made of one in a book published by the Italian, Fauste de Veranzio. Again in 1691, we are told, a man proved to be the life of the party when he entertained the Court in Paris by taking huge leaps with the aid of two parachutes which were lashed to his waist.

During all this time the shape of parachutes in general remained similar to those we now possess. In the effort to develop a more stable apparatus, Robert Cocking, an Englishman, contrived a novel design. The shape was conical, as before, except that the vertex was downwards. Framework supported the sides of the cone.

Apparently, no stray animals were available on the evening of July 24, 1873, when Cocking ascended in a balloon from Vauxhill Gardens, London. At an altitude of 5,000 feet, he mounted his invention and cut himself free of the balloon. For a moment the descent was stable and quite normal. The strain then became too great, the parachute collapsed and sent Cocking at a terrific rate of speed to his doom.

The development of parachutes progressed slowly, and of necessity, with balloons. Balloons were even deflated in the air and parachuted to the ground; the loose fabric gathered in the top of the surrounding network formed a perfect parachute.

Before the World War, parachute jumpers were dare-devils who earned a precarious livelihood by thrilling the crowds at County Fairs. The "jumps" were really "releases" from a free balloon. The parachute was usually secured to the hanging-bar of the balloon by a light cord. The lines, or shrouds, were secured to a harness worn by the jumper. When sufficient altitude had been reached, the performer opened the gas valve on the balloon, released his grip on the hanging bar and fell clear. His weight was sufficient to break the cord holding the apparatus to the balloon.

The parachute generally opened immediately and lowered the jumper to the ground, where he commandeered the first available horse and buggy to give chase to his falling, run-away balloon. He was always followed by an admiring army of small boys. His chase successful, the "death-defying aeronaut" returned to collect his salary. The more canny of the Fair treasurers never paid the bal-

# PARACHUTES!

By Lieut. H. B. Miller, U.S. N.

*Engineering Officer, Fighting Plane Squadron Two  
Aircraft Squadrons, Battle Fleet, U. S. Navy*

loonist before the jump because there were cases on record where the parachute had failed to open!

The advent of airplanes, however, introduced a new factor in jumping. A balloon, if it moved at all, con-

tinued to gain altitude, especially when the weight of the jumper was removed. This was an ideal condition for the jumper, since there was no danger of his 'chute fouling on the balloon. The airplane, on the other hand, was a fast moving machine, which might hit a person after he had jumped over the side. What was worse, the parachute, with its long tenuous folds, might foul some part of the plane and drag the aviator along dangling at the end of his useless 'chute.

Nevertheless, in March, 1912, Captain Bert Berry made the first jump from a plane at Jefferson Barracks, Missouri. The plane was a Benoist Pusher, piloted by Tony Jannus. The parachute was packed in a metal cone fastened under the forward part of the plane. Berry climbed down to the axle, slipped into the harness, and dropped from the plane. The jerk of the fall pulled the parachute out of its container, broke the retaining cord, and settled the adventurous captain gently down to earth.

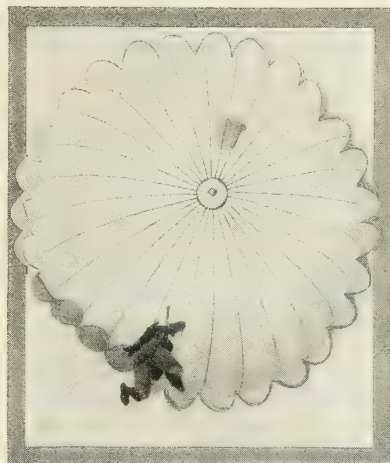
The impetus given to aviation by the World War was astonishing, surprising no one more than the involved belligerents. But on the whole, the efforts made to put more and more planes in the air served to over-balance any efforts made to safeguard the pilots already there. War was in the air. Men had to be

expended. Planes had to be built. No time was available to give to research for safety in a business that was at first looked on as exhilarating adventure.

The use of parachutes was forgotten until planes began to fly at night on bombing raids. Cities in the war zones learned their lessons rapidly and soon no lights were allowed to remain visible to the night bombers. If only cities could be illuminated for just a minute or so! Parachute flares were the result. These flares were thrown over the side of the planes. A time fuse set off the illuminating charge and released a small 'chute, which slowly lowered the lighting apparatus. This illumination helped the bombers to find their targets.

In this war, as in others, spies formed a more or less reliable means of information regarding the movements of the enemy forces. Again aviation showed the way. Secret agents were ferried across the front lines in planes and landed far into the back country. From there their spying activities began. This practice was very successful at first, but before long the irregular landing of any plane foretold a spy-hunt which resulted fatally for the agent, if discovered.

If only the landing could be eliminated! Of course, a parachute! But that could be seen as easily as a plane landing. Not at night! Thus the parachute began to lower human beings from a plane. The parachutes were made of black material and the mystery-men wore dark coveralls. Truly a ghost to come floating silently down in enemy territory at night.



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**Flexing the knees just before landing**



The familiar captive sausage balloon was used for observing enemy movements from the beginning of the conflict. This duty for a time was comparatively safe and routine. Soon, however, the art of airplane construction advanced to a point where fighting planes, which lived up to their names, were being produced by all of the belligerents. The occupation of a balloon observer then became a precarious one, indeed. Armed with machine guns loaded with incendiary bullets, pursuit planes began the playful habit of dropping down out of the clouds upon the unsuspecting gas bags. Anchored to the ground, these elephantine objects were perfect targets, and being inflated with hydrogen, were also perfect firetraps.

Parachutes were resorted to by the observers on both sides. That application was the first utilization of this old invention as an actual life-saving device. Always, before, it had been a thrill-producer for people who invariably thought the parachute-jumper was slightly crazy. Perhaps, in those days, they were right.

Having no past experience upon which to base their demands, the observers adopted the parachute gear in its entirety as used on the old free-balloons. The top of the parachute was attached to the balloon basket by a cord; the other end was secured to a harness attached to the man. The observer merely jumped over the side. His weight broke the retaining cord and allowed him to float gently to earth.

Continually carrying the 'chute attached to his body proved to be a nuisance, however. The parachute shrouds were then made fast to a small metal ring. The observer wore his harness as before, but he was free from his clumsy burden. When he desired to use it, he snapped the ring onto his harness and jumped exactly as he had before.

When struck by a flaming projectile the hydrogen-filled balloons instantly took fire and exploded. Unless the occupants were quick to jump, they would not get clear of the burning bag. If they did get clear, another danger beset them. Fragments of burning balloon fabric might fall on their cotton canopies and ignite them. Either would be disastrous.

The result of these dangers was to make balloon observers super-sensitive to the sound of diving airplanes and the rat-tat-tat of a firing machine gun. Either was a signal to jump immediately. Men frequently jumped even at the approach of friendly aircraft when their identity was in



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**A Navy jumper ready to make a descent by the "pull off" method**

doubt. There were even instances in which observers, in their haste to leave, failed to attach the parachute ring to their harness—and jumped!

The hazards to airplanes during this period were many. Fires in the air were common, wings often folded up during long, fast dives, and collisions were not infrequent. Always the pilot and gunner were carried helplessly down to their fate. The pilots, being only human, did not look ahead to a long or rosy future.

To Germany appears to belong the credit for first applying the parachute to heavier-than-air craft. At first each pilot made his own. Eventually each squadron began to manufacture such equipment for its own pilots, and finally the German Air Service began to supply all of its airmen with parachutes.

These safety devices were crude affairs, at best. A box or bucket was built into the plane with the opening downward. In this was piled the parachute. The harness was, of course, worn by the aviator. The theory was that the man would jump and pull his parachute out of its compartment as he went. Actually, the fabric was more than apt to foul on the plane and fail to allow the aviator to fall clear. It was better than nothing, however.

During the spring of 1918 the first successful emergency jump was made by a German flier in a Heinecke parachute. This German was patrolling near the front lines at about 22,000 feet, in terrifically cold weather. Suddenly his plane burst into flames. Here was a problem to test anyone's nerves. No one had ever before been saved by deserting a moving airplane during an emergency. Should he jump and either be saved or quickly destroyed, or should he stay with his ship to await a slow fiery death? What thoughts must have flashed through the mind of that pioneer! After a few futile attempts to extinguish the inferno by slide-slipping, the pilot made his momentous decision. He leaped over the side. His parachute opened immediately. His progress downward was made directly over the front lines, but at the last moment a gust of wind drifted him behind the American trenches. The German's legs were nearly frozen, and both of them had been shot by soldiers in both lines. As if the aviator had not encountered sufficient danger for one day!

The Allied Air Forces immediately adopted the balloon parachutes that appeared most practicable for their air-



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**Parachute inflating after the jumper has been pulled off**



planes. From these the newly organized American Air Service developed two types of parachutes, which combined the best qualities of the Allied safety devices. During the same period, the Engineering Division of the American Air Service was carrying on extensive experiments in the United States. Then the war ended.

The experiments were continued, however, at McCook Field, Dayton, Ohio. Tests were made on all the parachutes available at the close of the war. The men carrying on this work were J. M. Russell, J. J. Higgins, Floyd Smith, G. M. Ball, and Major E. L. Hoffman.

Very little data was available for these men to use in their work. The parachute designed by Charles Broadwick offered some ideas to the investigators. No one knew what quality of material was most desirable, nor the inflated shape which would give the best results. It was known, however, that it was imperative for the parachute to be manually operated; that is, when the aviator jumped from the plane, his parachute would be with him unopened until after he was entirely clear of his ship. The jumper would then operate some opening device and float to earth under the inflated 'chute.

Besides the chances of fouling on the plane when the parachute was attached to the ship, cases actually occurred in which the pilot, after jumping, traveled downward at the same speed as the plane. Hence, the parachute retaining cord was never broken free of the ship. The apparatus never had an opportunity to function.

Silk was early decided upon as the most desirable material, and Japanese habutai silk has been used almost exclusively ever since. There are several reasons for this. Its strength for its weight is great; it can be packed in a small space; it has a "springiness" which permits it to unfold and separate easily. Of vital importance is the fact that it has the ability to resist flames.

Cotton fabric can be used, and has been, successfully in a great many cases. But it deteriorates more rapidly than silk. As long as the supply of silk is plentiful and comparatively cheap, it is likely that we will continue to use it in our parachutes.

Whenever a new idea occurred to the investigators, one of the men would go up in a plane and jump, or a weighted dummy would be dropped, to prove or disprove the worth of it. The slow method of trial and error was the only practical means of progress. Nevertheless, by the latter part of 1919, a serviceable 'chute had been developed.

Several old theories had to be disproved. Mistakes in reasoning were often discovered by accident. It was for-



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**The start of a free-fall jump. The jumper has his hand on the rip-cord**

a delayed jump—that is, the distance from the point of departure from the plane to the point of parachute operations—is now said to be more than 9,000 feet.

It was further argued that a man could not climb clear of a plane falling or diving at a high rate of speed. In 1920 Lieutenant Patterson and an observer were sent aloft from McCook Field to test machine guns in the low temperatures found at high altitudes. Just what happened is not known, but down came the plane out of control. At about 10,000 feet the wings were torn off by the terrific velocity. Finally the tail surfaces parted and left the fuselage to hurtle down to destruction alone. In spite of the speed, one of the aviators climbed out onto the fuselage. This proved clearly that a man could escape from a fast-moving plane if only he had some means of saving himself after he succeeded in getting out. It is indeed, unfortunate that so many men had to sacrifice their lives before certain definite facts were known.

When the jumper touches earth after a drop in a strong wind, he is apt to be dragged along the ground for some distance before he can "spill the wind" out the 'chute, and get out of the harness. Any bruises that result from a jump invariably occur at this stage of the procedure. A quick releasing device was adopted with which to disconnect the jumper from the parachute upon landing. It consisted of a lever which was manually operated. This idea bid fair to be quite successful until three men within a very short period released themselves accidentally while still



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**Settling easily to earth with the 'chute fully inflated after a free-fall jump**

hundreds of feet in the air, with the result that this innovation was rapidly cast aside.

Various improvements and modifications resulted until parachutes reached their present form. Various types of parachutes have been produced and offered to the air services for testing. Some have been of value; others have been far from positive in their actions. (Continued on page 264)



# LOS ANGELES TO CLEVELAND NON-STOP

By Henry J. Brown

*Winner of the Non-Stop Derby in the National Air Races.  
Air Mail Pilot for National Air Transport, and Vice President and Treasurer, National Air Pilots' Association.*

**A**LTHOUGH I could see Cleveland Airport quite clearly, I was still a little more than five miles away from it when my engine began to sputter because all the gas had been consumed. Almost immediately it cut out entirely, leaving me faced with the necessity of stretching my glide as far as possible in order to land at the airport. I knew it could be done, though I realized that to fail by even the shortest margin meant my disqualification in the non-stop race. Nevertheless, I set the Lockheed down in front of the grandstand, having made a forced landing at the finish line.

My ship, a brand new Lockheed Air Express powered with a Pratt and Whitney Hornet engine, is owned by the General Tire and Rubber Company of Akron, Ohio. The plane was entered in the Non-Stop Derby partially for that reason in itself and partially as a means of ferrying the ship across the continent for delivery to the owner. Aside from the flights made by the test pilot at the Lockheed factory, it had not been flown in service. For the race, the cabin space was utilized for special tanks to increase the fuel capacity beyond that provided by the wing tanks. To increase the speed by reducing head resistance, the engine was fitted with a N.A.C.A. cowling. The landing wheels were equipped with special streamline covers which increased the speed noticeably, though how much has not been determined definitely. The special cowling seemed to cause the ship to float more than is the case with planes not equipped with it.

My preparations for the race began when I left Cleveland for California on August 15. Some difficulty was encountered in getting the plane, and it was later than I expected before everything was com-

pletely ready for the flight.

On Saturday, August 31, the plane was fueled for the take-off—350 gallons of Shell gasoline in the fuselage tanks, together with

200 gallons in the wing tanks, and 23 gallons of Kendall oil which we calculated to be enough to make Cleveland. After a few final preparations, I took off at night from Los Angeles for Cleveland, planning to arrive there before six p. m. the following day. Although I experienced some trouble getting off, I was soon flying eastward at full throttle. Since the course I had plotted lay over a desolate, uninhabited territory, I saw the lights of only a few widely separated ranch houses and no cities or communities of any kind. If I had been forced to land in that region, I should probably have found myself several hundred miles from the nearest railroad.

Because of the inclement weather conditions, the gas consumption was greater than had been calculated, which accounts for the narrow margin

by which I made Cleveland Airport. When the fuel in the wing tanks was used up, I had to start pumping that in the fuselage tanks to the gravity tanks. In all, 350 gallons had to be pumped to the wing tanks, which is no easy job. In the rarefied atmosphere of high altitudes one feels the exertion more, and for this reason I flew the ship lower while pumping the gas.

The course as flown extended across the state of Kansas, over Fort Leavenworth, across Missouri to Moline, Ill., thence across Illinois, Indiana and Ohio to Cleveland. Actually I headed a bit north of my plotted course in order to avoid some bad weather about half way to Cleveland. This meant plotting a new course which would bring me in the straightest line to my objective. I had

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Brown, just after his arrival at Cleveland



The plane in which Brown won the race, the Hornet-powered Lockheed Air Express, flagship of the sky fleet of the General Tire and Rubber Co. Brown is in the center of the group at the side of the ship

# "THE WORLD'S GREATEST SHOW"

"THE WORLD'S GREATEST SHOW" was what the late P. T. Barnum called the

Barnum and Bailey Circus, but if he could have seen the 1929 National Air Races at Cleveland he'd have had to run his circus in second place. In the ten days of the races 450,000 people either paid the \$450,000 gate, or else bothered Cliff Henderson for a pass—Cliff figures that 50,000 paid willingly and the other 400,000 only paid after they'd been in trying to horn a pass out of him. The number of hot dogs consumed, including those that had been hot but had cooled off, if laid end to end would reach from Cleveland to Boston, though I don't know why even a hot dog would want to go to Boston. And the energy generated by the escaping gas from 2,568,654 opened pop bottles, if collected in a bomb and exploded in Washington, would be enough to blow the entire U. S. Senate as far as Atlanta, Georgia. The hot air generated in speeches by famous men, local Babbitts, politicians, and other desperate characters was enough to reinflate the *Graf Zeppelin* in case it had got a puncture and been forced down there.

Glenn Curtiss didn't see the show. If he had, he would have remembered the flight he made in Cleveland, August 29, 1910, when he flew from Euclid Beach to Cedar Point, a distance of 50 miles or so, sitting out in front of his Curtiss Pusher with a couple of inflated inner tubes wrapped around him in case he came down in the lake. And now, only nineteen years later, 600 airplanes were gathered on a million dollar airport, loaned to aviation by Jack Berry, to put on the world's greatest show. There's progress for you!

But great as the progress in aviation has been during the past nineteen years, a startled world has been treated to the spectacle of an even greater progress: the steady, purposeful progression of the nation's womanhood from the kitchen to the front page of the newspapers. The flight from the kitchen sink and the wash tub has been going on for some time, but it took the Women's Cross-Country Air Derby from Santa Monica to Cleveland to drive into the thick skulls of the nation's manhood the unfortunate fact that woman at last was emancipated, even if she looked somewhat the worse for the process.

And worse she undoubtedly does look. I state that fact deliberately, and knowing full well that I am courting destruction. I state it boldly, clinging to the hope that after my death at the hands of some infuriated woman a monument will be erected to my memory—if the women leave even a memory of me to erect anything to. But let it be said—nay, let it be shouted from the housetops—that in this land of the down-trodden male there yet lingered, a hang-over from the Stone-age Period, apparently, one man (and a married man at that) bold enough to come right out and say, "Them women don't look good in pants!"

You may say what you like about them; you may admire their bravery, their skill, their good sportsmanship, their amazing adaptability to things that are new to them. You may say what you like, but what I say is, "They don't look good in pants!" And something ought to be done about it. I don't know what. Don't ask me—I'm not Paul Poiret nor Paquin, nor even Lady Duff Gordon. I don't know a brassiere from a lavalliere—I'm not even sure of the spelling—and what a bit of foulard lingerie is

By

*by Caldwell*

I have no idea. I guess it's something fluffy and sort of teasing to the males. But I'm only guessing. In short, married and all as I am—though I'm not boasting about that—I know no more about women's clothes now, after paying for one woman's garments for nine years, than I did when I was a carefree youth. But this much I do know—no woman looks

good in pants. That's my story and I'm going to stick to it—until some Amazon in breeches finally knocks me down and forces me to sign a confession saying that I admire the things.

Now, if I come to my death as a result of this article, the blame must rest upon the Editor of AERO DIGEST, who said to me at the Show, "We want you to write up the Women's Derby." I was stunned.

"But I know nothing about women," I told him. "I'm a married man. You want to get some bachelor to do this thing for you. The only kind of man who thoroughly understands women is the bachelor—that's why he's a bachelor."

But the Editor pleaded with me. "Cy," he cried, "you must help us. You're the only one strong enough to do it, and survive. If the women get after you, why you can swim across Lake Erie again and escape."

He was in a very nervous state, so to calm him I consented to write up the Derby. The article will *not* be read by Mrs. Cy before it is published, or I know it would never be published, at least in its present form. It would be pruned, as it were; it would be rendered innocuous.

But getting back to the subject of dress, or the lack of it in this case, I send out an anguished call for help to the dressmakers, and possibly the pants-makers, of America: "Come to the aid of these distressed damsels! Do something for them—or to them! Fix them, somehow, anyhow! Get them out of that rigging, borrowed from us men, and get them into something, no matter what, that will leave them their girlish charm, their feminine allure, and yet not get caught in the propeller!"

Now I lean back waiting for aid, having raised my voice, like a pelican crying in the wilderness, on behalf of these suffering females. Timidly I offer a few suggestions, knowing full well that no woman of this modern day ever accepts a mere man's suggestions. But at least, as a member of the down-trodden sex, I may be permitted to publish the feelings that I, in company with many men, hold. At least, ladies, grant that I know my own feelings in this matter. I know when you girls look good to me and when you don't. Not that you give a damn what my feelings are toward you, I know that. But you, for all your modern ways, aren't in any essential different from your grandmothers. You still want to look good to us men, and we still crave that you look good to us. And you'll never do it in pants, rest assured of that. You look too much like one of us. Don't you see that? Or is it that you don't care a hang? Is that it?

Well, I'll admit that we men are becoming less and less essential to your welfare as the days roll by; you can do nicely without us. But at the same time, we are not yet in Heaven where there is no marrying or no giving in marriage. We're right here where it is the normal ambition of every woman to be married—and the likewise normal ambition of every man to

(Continued on page 282)



# THE WOMEN'S AIR DERBY

*Experiences on the Flight from Santa Monica to Cleveland*

*As Related by the winner of the Heavy Plane Class*

Louise McPhetridge Thaden

"GOODBYE old egg—lots of good luck—happy landings."

The "Sunburn Derby" is over. With a deep sense of regret came the realization that we were each going again our separate ways, probably not to be together again until the second women's national air derby in 1930. This year's derby had brought us all together for the first time since women have started winning their wings. We each had found a staunch friend in the other, and, for so large a group of women, that in itself is unusual. We had found that the rest of us were good fellows, and further, good sports.

From the take-off at Santa Monica, on August 18, until the finish line was crossed at Cleveland on the 26th, there was not one squabble. There were not even any real complaints insofar as the flying was concerned. We did object to being made exhibits and more or less circus attractions. We did complain at being kept up all hours of the night. And we didn't like to stop so often—but then, who wouldn't?

We were all delighted to get away on the start. It was rather nerve wracking to wait—just between you, me, and the gate post, we were a little nervous and a wee bit excited, for here was an adventure. A leap into the unknown field of cross-country racing, about which we knew little. How well we did the job, we must leave to you.

At San Bernardino, the runway had been prepared in a few days and nights, and in spite of the gallant efforts of a fleet of water wagons, was several inches deep with dust. The approach was bad, but we all got in all right, with the exception of one entrant who was flying a plane two years old, the landing gear of which gave way.

Although we were tired, we dressed and attended a banquet—after which we went to a meeting of pilots, where we received instructions. The route had been changed—



Mrs. Louise McPhetridge Thaden

we objected. At eleven o'clock we wanted sleep worse than ever but were told no ships would be serviced unless we were out to supervise the job, inasmuch as a few mistakes had been made. So out to the field we had to go. Finally we got to bed at 1:30 but were up at 4, because we took off at 6. Eight days of more or less the same thing! Do you wonder we were tired and perhaps a little irritable? On the whole, however, the course of the derby ran smoothly and, although we occasionally did get some rest, we didn't get much time to ourselves.

Yuma—ten degrees hotter than blazes. Not all of us accounted for. The run from San Berdu via Calexico had been a tough one because of the heat. The desert between Calexico and Yuma hadn't made the flight any easier. We drank gallons of water, milk and pop, and we munched

sandwiches and ate fruit while trying to stall to give Amelia's propeller time to arrive by plane from Los Angeles as our ships were being gassed. Three hours of this and we were on the verge of sunstroke. I think probably the theory of Marvel's death can be found here; I believe, together with others, that she became ill, was flying low, unloosed her belt to lean over the cockpit—and knew no more. Wherever she now is, we know that she knows the things we would like to say and can find no words to express. Pioneers can only look forward, never back—so each of us carried on and flew perhaps a little better race than we had thought possible.

At the control stops the majority of us arrived on schedule. In fact, at most places we came in from 20 to 30 minutes before we were expected. And there were only three instances in which the entrants were not ready to take off on schedule time.

At El Paso we were held over because of bad storms through the passes. With a (Continued on page 299)



The line up of planes at Santa Monica, California, just before the start of the women's race to Cleveland

# AERO DIGEST

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## INEXCUSABLE TRAGEDIES

**P**ERHAPS some of the many recent lamentable events among fliers, and those who have been involved by them, really have been "unpreventable." Nevertheless, even among those which charitably may be so classed, there is probably an unknown percentage which might have been avoided by proper care, or by the exercise of that skill in emergency which ought to characterize every pilot licensed for transport flying, or by sufficiently thorough inspection of plane and equipment before the flight began.

Others of the recent tragedies have been even less excusable. As an example, consider the case of the pilot who swooped upon and crashed among bathers in the Coney Island surf, with fatal results. He reported lack of gas as the cause of his forced landing. Having just discharged passengers at an airport with servicing facilities, it is reasonable to believe that he should not have been allowed to take off with his tanks nearly empty.

There is but one way to prevent the continuation of such mishaps from harming the whole art and business of American aviation, and that is for the men most deeply interested, the men of the industry itself, to take the initiative in gathering facts, encouraging the compilation and enforcement of rigorous and more effective safety regulations, and devising penalties and the manner of imposing them.

If the industry fails to take such measures, we fear, hundreds of legislators in the next sessions of the law-making bodies of all the states will broach their notions on the subject by introducing bills restricting the operation of aircraft in every community. The result will be that commercial aviation will be shackled by chaotic, absurd and inconsistent legislation, which will serve to stunt its healthy development for many years.

Certainly no one will deny that a considerable proportion of these recent crack-ups might have been avoided if regulation of both machines and flying had been as efficient as we all know it might be. It is perhaps true, as some have said, that in American aviation individuals habitually take greater chances, more recklessly, than is permitted in other countries. Nothing could be more desirable than enterprise and daring in the development of American aviation. But conservatism tempers the daring of the successful military commander, captain of industry, sports competitor. And enterprise succeeds only if it is founded on careful plans, undertaken with reasonable assurance that they will produce success.

Naturally, sympathy and deep fellow-feeling for the victims of disaster emanate from every heart interested in aeronautical endeavor, but the first by-product of these admirable sentiments among us should be the determination to promote such thinking and procedure among others as will tend in the future to save them and the industry from untoward events.

## CLARENCE YOUNG

**I**NTELLIGENCE, as well as virtue, is its own reward. Clarence Young, named as new Assistant Secretary of Commerce for Aeronautics, is proof of that. Under the necessity of filling the large place left vacant by the resignation of the Hon. William P. MacCracken, Jr., the President's search necessarily was for a human being of man's size. He found him close at hand in the person of the man he named—found him fully trained by actual service with MacCracken but with a mind capable of doing far more than assistant thinking.

The pleasant episode is one more proof that in America all needs can be supplied without borrowing of the neighbors.

AERO DIGEST has, in the new secretary, almost a parental pride and interest, for we remember with a splendid thrill of egotism that his appointment to the vital job for which the Senate presently will confirm him, is in accurate accordance with a definite suggestion made in these columns as soon as we had heard that the Hon. "Bill" was to leave the service of the Government and become a magnate on his own.

## SELLING STOCK IN BUBBLE "COMPANIES"

**Q**UITE as dangerous as any other threat against the rapid progress of American aviation is that involved in many fly-by-night fake stock enterprises, some of which recently have been uncovered and many of which we all know about but have not yet been able to expose with conclusive evidence.

It was a delightful episode that the undoing of the notorious Montgomery and Tiffany of Hadley & Co., New York, who were cleverly trying to involve in their nefarious schemes the wholly innocent and fine fliers, Williams and Yancey, should have come to a head in the AERO DIGEST office.

The industry ought to take cognizance of every stock flotation even remotely claiming a connection with it, and should not depend wholly on the Better Business Bureau for protection against the "Wallingfords" and worse who naturally will be attracted to it in increasing numbers, striving to roam the air like birds of prey, as they have for years roved terra firma, like ravening wolves, seeking whom they might devour.

It is obvious that the industry itself must take this task in hand. Although in New York the Martin Act gives the Attorney-General the right to proceed upon suspicion against any who reasonably may be thought to have in mind the mulcting of the public through dishonest finance schemes, Montgomery and Tiffany were not brought to book until Williams and Yancey, fearing that their names were being used for crooked purposes, came to us and explained their situation.

It seems to us that it is the business of the Aeronautical Chamber of Commerce to appoint a committee to investigate every offering of stock in doubtful or unknown aviation enterprises, hiring expert assistants if necessary, in order to make the work effective. The industry should be able to find experts who could spot crookedness almost at a glance. This done, in any instance, the case should be placed without a moment's delay in the hands of the authorities.

No other young industry ever has done this, but the air industry by its very nature is different from and faster



than any other industry. It has set many fashions. Now let it set this of furnishing the public protection against all crooks who would use its glories as a means of blinding the investor, large or small, while the deft fingers of trained pickpockets slip in to get the wallets.

If AERO DIGEST, working quite casually on the moment's spur, and unaided by any organized coöperation, was able to stop the vicious plans of one carefully scheming and up-to-then successful gang of crooks, then a special committee of the Aeronautical Chamber of Commerce should be able to check many gangs of crooks. For there are possibilities of "pickings" in the air industry, and where such possibilities exist such crooks still thrive.

Any individuals who personally know, or by chance hear, of any effort to swindle in connection with the sale of stock in alleged air activities are invited to address the editor of this magazine, sending in such information as may be at hand. We then will inform the proper Federal officers, put paid investigators on the job and get at the bottom of it. The public already has been mulcted of millions. We don't want that sort of business in the aircraft industry.

### THE AMERICAN AIR PROGRAM

**T**HAT a powerful influence has been and is at work in Washington to scrap the *five-year air program* was common gossip at Cleveland, among those who ought to know, and such possibility is still apprehensively discussed. That many are opposed to the five-year (or any other) air program may be gathered by anyone who has read about the Shearer investigation and the scandalous anti-air and pro-armor plate propaganda which led up to it. Our views upon this detail of the subject are mentioned elsewhere in this magazine.

We do not believe, however, that Mr. Hoover can be swayed by anti-patriots or selfish interests into "scrapping" any part of Uncle Sam's air plans, unless he wishes to substitute for it something much more comprehensive and effective. The influence of the anti-air group in the Navy should be pretty well discredited by now; and every other anti-air group must be recognized as equally selfish and unpatriotic. Hon. W. Frank James, in his California speech, expressed the right idea when he said that the Five-Year Program should be washed out. Yes—by the substitution for it of one five times as great.

### LIGHTER-THAN-AIR

**I**F America wishes to be supreme in the air, and there is no reason why she should not both wish this and achieve it, she must consider the development not only of heavier-than-air but of lighter-than-air aviation. It is *easy* to sit back in a comfortable office chair and criticize the performance and efficiency of the *Graf Zeppelin*; but it is infinitely more *effective* to sit forward in that chair, bend over a desk and work out plans whereby the United States may profit by the lessons coming from the achievements of the great German dirigible and the enterprise of her industrious commander, Hugo Eckener.

A certain small group of Americans persistently and intelligently have advocated lighter-than-air development, and have studied the associated problems. A recent striking evidence of their noteworthy accomplishments is the all-metal dirigible ZMC-2 which, though small, is quite large enough to be an object-lesson, and positively all-American, glistened bravely, if by comparison minutely, beside the mighty *Graf* and *Los Angeles* above the airport at the Cleveland show.

Americans who knew regarded both the little and the

big American ships with a certain complacency because they derive their lift from Helium gas, which will not burn, and of which we possess the only sources at present known. Dirigibles are of course, susceptible to accidents other than destruction by fire, as was evidenced when the *Shenandoah* was destroyed by a twisting thunder-storm, but on the *Graf's* trip around the world the greatest and the ever-present danger was that of fire ignited by lightning, by some spark caused by impact of steel on steel among the numerous machines, or by some careless passenger or member of the crew.

America's possession of the world's only developed supply of Helium gas, as well as America's development and utilization of the interesting, ductile, yet tough metallic envelope with which the new experimental all-metal airship has been constructed, will enable us, in the future, to proceed with effective dirigible construction such as no other nation in the world can undertake, giving us a great advantage in lighter-than-air enterprise. It is most desirable that we should fully appreciate and profit by this situation.

What the dirigible may and inevitably will mean in long-range travel is strikingly indicated by the history of world-circumnavigation.

1519—Magellan, 3 years and 29 days.

1577—Sir Francis Drake, 2 years, 10 months and 20 days.

1889—Nellie Bly, 72 days, 6 hours and 11 minutes.

1890—George Francis Train, 67 days and 12 hours.

1901—George Fitzmaurice, 60 days and 13 hours.

1903—Henry Frederick, 54 days 7 hours and 2 minutes.

1907—Col. Burnley-Campbell, 40 days and 19 minutes.

1911—Andre Jaeger-Schmidt, 34 days, 42 minutes, and 38 seconds.

1913—John H. Mears, about 30 days.

1924—U. S. Army fliers, 363 hours actual flying time.

1926—Evans and Wells, 28 days, 14 hours and 36 minutes.

1928—Mears and Collyer, 23 days, 15 hours and 21 minutes.

1929—*Graf Zeppelin*, 21 days, 7 hours and 26 minutes.

### SOME REASON FOR OPTIMISM

**R**EAD carefully the following, uttered by Assistant Secretary of the Navy Jahncke, as a part of his comment on the recent naval maneuvers in the Panama Canal Zone. He had already described the attack, and continued:

"... Theoretically the Panama Canal is now an impassable wreck. Take this as an accepted fact in the world's naval circles, that when you can get aircraft even 250 miles off your enemy's coast, the majority of your airplanes will reach their objective and drop their bombs with deadly effect. The only answer to an attack like that is an equal or superior force on your own aircraft carriers, protected both by their own armament and an escort of fast cruisers and destroyers, able to put out to sea at top speed and attack the enemy carriers before his air fleet can be launched. A navy limited to the surface of the sea might as well be scrapped."

General William Mitchell said the same thing, virtually, and was court-martialed vindictively, with a determination to crush him completely, though he was acknowledged as one of our most brilliant officers.

That an Assistant Secretary of the Navy now should repeat these obvious truths, and without any Washingtonian grandee ringing for the patrol wagon, is the most hopeful thing which has happened in the national capital for a long time.

# DEVELOPING A NEW MODEL AIRPLANE

THE designing and development of a new airplane is today as elaborate a process as that undergone in introducing new models of automobiles. The procedure in both industries usually is in marked contrast to early-day methods, or to those still in vogue in modern small factories. Under present conditions, developing a new airplane which will meet with the exacting requirements of the Department of Commerce, and which will perform sufficiently well to attract a market, calls for vast financial resources and efficient factory organization.

Twenty-five years ago the early automobile designer scratched out rough drawings, turned out his parts in a machine shop, assembled his car by hand, and took it out on the road, usually to find that it had to be rebuilt and defective parts changed. When the vehicle was finally developed so that it would run fairly well he started a small factory, sold cars, and let his customers discover the "bugs" which later developed in service. Then, he made still further changes. In other words, he used his customer's experience to improve his product.

In contrast to this haphazard method, modern automobile factories maintain tremendous engineering staffs, whose principal work is to design new models and perfect improvements. Elaborate proving grounds have been established, where fleets of new cars run day and night under all varieties of service conditions to determine their weak points before they reach the market.

Methods of developing new airplanes have undergone the same transition. Most early commercial planes were designed by fliers who had some engineering training of a practical or theoretical nature. The planes were built from temporary sketchings and hurriedly placed in production. Those who flew the planes were unhappily left to discover what was the matter with them, much to the disgust and danger of the purchasers, and always to the disadvantage of the manufacturer.

In these days of keen competition, the reputable aircraft manufacturer who has the means takes every precaution to determine any defects, no matter how minor in character, that might react against his product. Corrections are made before the planes are put in public service.

Differences in the performance of rival airplanes stand out more sharply and are more apparent to critical purchasers than are those of automobiles. If a new plane is slow on the take-off or responds unnaturally to the controls when in certain attitudes of flight, pilots and aircraft operators quickly discern its inferiority and become almost universally unfavorable toward it.

Many pilots expect to find abnormal spinning propensities in all new planes of radical design. Consequently, one of the main tasks the manufacturer has, is to prove his craft airworthy by careful spinning tests with full load. Otherwise, he cannot hope to convince those who fly that

By J. Don Alexander  
*President, Alexander Aircraft Company*

this is a desirable ship. Moreover, there must be strong evidence that the plane will stand up under service conditions and that, within the limitations of the purpose for which it was designed, it will be economical to operate.

Today the manufacturer's job is to make his plane ready for the public, and meanwhile to make the public ready for the plane. One is accomplished by prolonged and diligent research, the other by intensive advertising.

To illustrate the slow and painstaking process involved in introducing a new airplane of advanced design, allow me to review the development of the Eaglerock Bullet low-wing cabin monoplane, from the time when it was first conceived a year ago, until the present when we are preparing to produce it in large quantities.

The first conception of the Bullet arose from the realization that the biplane is essentially a high drag type of airplane, because of its many exposed struts and wires, and that high horsepower is required to reach a fast top speed.

The designers of the new ship, therefore, determined to produce a plane which would offer as little resistance and drag as possible, and, as a result, would require less horsepower—and a less expensive engine—to attain a high speed and carry a heavy load. In other words, the designers sought to develop an efficient machine by incorporating "clean lines."

The company wanted a fast plane, yet one with a low landing speed. This desire for a slow landing plane, which could safely land on and take-off from small fields, was one reason for our choice of the low-wing type. The low-wing, according to our deductions, intensifies the cushion effect of the air in relation to the ground as the plane makes a landing, thereby causing it to land much more slowly than if the wing were on top of the fuselage.

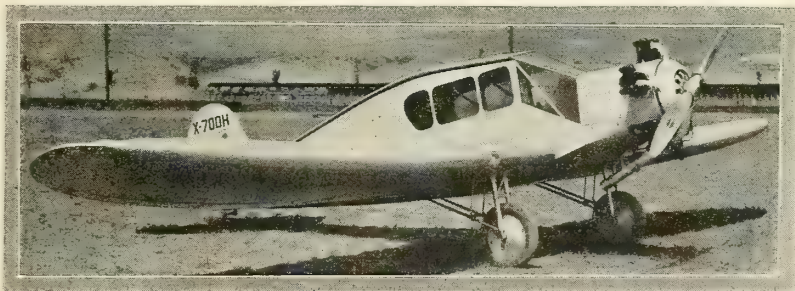
The designers, however, were anxious to avoid any sacrifice of structural safety in order to obtain lightness and speed. In some cases, to accomplish this end, designers have abandoned the welded steel tubing fuselage,—a procedure which

a safety standpoint.

The low-wing type was chosen because we considered its aerodynamic efficiency superior to that of other types. Moreover, it would be lighter to build, because the fuselage need carry no heavy wing and consequently need not to be built correspondingly stronger to bear the extra stress.

To sit above the wing, rather than have it hang over their heads, we believed, would also be more reassuring to passengers. We concluded that the low-wing is safer in a ground crash than other types because pilot and passengers are not between two weights—the ground and the wing. The wing acts as a shock absorber protecting the cabin.

(Continued on page 278)



The Eaglerock Bullet, the model most recently introduced by the Alexander company





## OBSERVATIONS AT THE NATIONAL AIR RACES AND EXPOSITION

**N**OW that it's all over, what *was* the high point of the National Air Races and Aeronautical Ex-

By Russell C. Johns

position? Was it the admirable precision flying of the Navy High Hats? The superb skill of the military pilots in tactical formations? The astounding spectacle of Speed Holman's Ford trimotor looping and rolling like a Boeing Pursuit ship? Or was the greatest value and interest in the exhibits in the huge auditorium; the "flying freight car" exhibited by General Aircraft; the gigantic Wright Cyclone engine, or the rows of brilliant display booths?

It is difficult to generalize about a complicated affair of this kind. Scores of widely scattered activities were being carried on at the same time, both at the airport and in the city of Cleveland. Technical meetings were in progress; national societies were holding elections; thousands of irrelevant questions were being answered at the Exposition by patient exhibitors; Derby fliers were arriving from every corner of the country; dealers and distributors were being signed up in hotel rooms; service and repair crews were laboring profanely in stuffy hangars; spectacular races, stunts and formations were thrilling the packed grandstands.

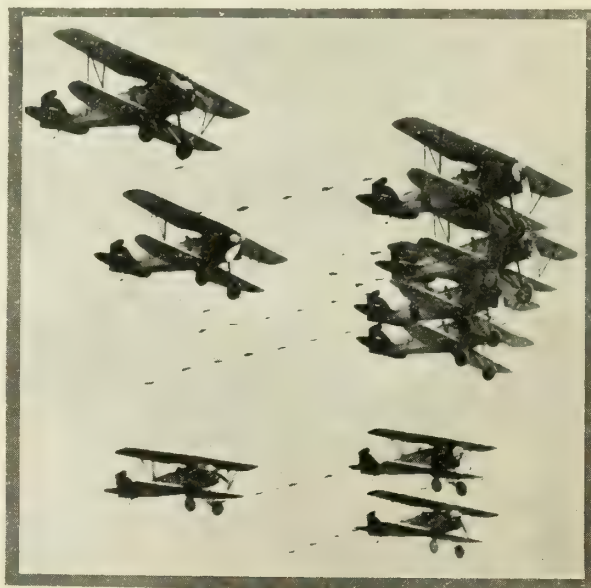
All these and various other things were going on simultaneously. Nobody could see more than a fraction of the show at once. In order that those who did not attend may get as clear a picture as possible, it is perhaps best to treat the National Air Races and Exposition sectionally; one phase discussed exhaustively before the next one is considered.

There was, for instance, the first sight that greeted the

visitor on arrival at the field in his airplane. In order to make the field safe for racers, stunters and commercial ships, a rule had been drawn up stipulating that arriving pilots should land on the side of the field opposite from the grandstand, where the line of new brick and steel hangars bears the names of nationally-known transport lines and commercial dealers in airplanes and accessories. Coming in for the landing, one could see rows upon rows of planes on the commercial side of the field; as soon as the landing

had been made, a space in one of these rows was either assigned or assumed, and there one's plane stayed as long as any racing was being done. All demonstration and test flights had to be made in the morning before the race program began.

Among the instructive sights in the commercial district was the new Austin Cantilever hangar, built in record time for use by huge trimotors which visited the show. Interesting airplanes by the dozen drew attention from the thousands of visitors, among them being the Jersey Mosquito, built in 1911 and still boasting prehensile skid sections in its landing gear, but which flew here from Newark just the same. The "mystery" Travel Air, which later displayed such



Navy fighting planes flying in formation tied together

P. & A. Photo

astounding speed and maneuverability, was quartered in one of the hangars along the line, but no questions about it were being answered. In the new Austin hangar was a Fokker F-10 trimotor belonging to the Richfield Oil Company, which has been finished with one of the most luxurious interiors ever seen at the Cleveland show or elsewhere in an airplane which operates every day. On the backs





of the deep seats were hand-made tapestries in which the more important astronomical constellations were represented by modernistic patterns; designs inspired by the sensation of flight were woven into the upholstery and wall decorations; mahogany desks indicated that the company executives who flew here in it might turn their attention from the beauties of the sky to the banal problems of business on occasion.

Little flivver taxicabs were darting up and down the concrete strip in front of the commercial hangars to take the visitor around to the grandstand side of the field for a few cents a mile. It must have been several miles to the grandstand the way they went, for the fare averaged about thirty cents. If one had been looking at the commercial planes for some time, however, his lungs were probably well coated with dust, and by walking around the edge of the field to the grandstand he couldn't get any dustier and there were a few interesting items to observe en route.

Having left the last of the great hangars and the scores of airplanes and started on a forced march along a bumpy road choked with traffic, one soon encountered a succession of one-story buildings placed at random along the side of the field separating the commercial hangars from the grandstand. Among the first of these was the Army headquarters for the visiting military pilots, whose bombardment, attack and pursuit ships were arranged in neat "company front" formations directly behind the building,

affording the only shade for the enlisted men who were detailed to service and guard the planes. Languid Air Corps pilots were draped about the doorway in nonchalant attitudes, waiting for their cues for the daily formation flights. Farther on, a large sign announced that this was the headquarters for visiting civilian pilots. Please register. Inside, a young man of-

fered a pencil and thick book, in which were hundreds of names representing every section of the United States.

Then there was a Red Cross hut, ornamented by a businesslike nurse in a stiff white uniform. Next came the Contest Headquarters; a scene of never-ending action. Cars drove up in dozens, stopped with a screech of brakes and disgorged helmeted men who dashed into the building. Phones rang incessantly. Excitement reigned.

A few yards farther on was the Navy hut, headquarters for the Navy and Marine Corps delegations. An atmosphere of quiet dignity prevailed around the building, but on the field outside of it the Navy pilots took part in violent debates on all sorts of subjects. Three or four Sikorsky amphibions were drawn up abreast of each other, and the shade under the line of overhanging wings was occupied to the fullest extent.

These buildings were all built into the fence; that is, one door led from the roadway and the opposite door opened on the field. In the spaces between the buildings, and a few feet farther away from the fence, good-sized concession stands catered to the insatiable thirst and mysterious appetite which seems to attack every visitor to affairs of this kind. They were all alike—each one had a ticket booth where the prospective customer had to buy a string of checks before he would be noticed by the overworked hot-dog vendors.

Eventually, perhaps, the visitor would arrive at the grandstand. This term is liable to conjure up memories of

county-fair days when a grandstand was a small wooden structure which could hold a few hundred spectators and had one entrance and one exit, through which the crowd had to struggle. At Cleveland Airport the grandstand was really a colossal bleacher, which extended a distance of several city blocks and which could hold about 30,000 people. In the center



P. & A. Photo

Lindbergh greets Dr. Eckener at the races. Reading from left to right are City Manager W. R. Hopkins of Cleveland, Mrs. Lindbergh, Cliff Henderson, Col. Lindbergh, Erik Nelson, Wm. P. MacCracken, Jr., Dr. Eckener and W. A. Arthur.



was a five-story administration building, provided with observation balconies, press box, control tower, headquarters for race officials, offices for Cliff Henderson and Floyd J. Logan, managing director and chairman of the race committee, respectively, and accommodations for officers of societies prominent in national aeronautics. The reserved section of the stand and the preferred boxes were entered through this building by means of a palm-decked, carpeted promenade guarded by uniformed attendants. A sensational white touring car, placed at Henderson's disposal during the meet, helped decorate this impressive center of activities.

Announcements regarding the activities were made through a most effective loud-speaker system, which enabled everyone in the stands to understand exactly what was going on. Army and Navy pilots were asked to interpret the complex formations which their squadrons were executing aloft; famous visitors to the show were requested to address the throngs. During the last day the microphone was turned over to Dr. Eckener during the few minutes he spent at the judges' stand, enabling the record crowd to hear the famous Zeppelin commander's voice praising the show and regretting that he could not spend more time there.

Exits were provided every few hundred feet, and opposite each was a wide area policed by National Guardsmen in which no parking was allowed. After each day's program the bleachers were emptied without congestion and parked cars were located without difficulty. The parking situation was masterfully handled. Thousands of cars were parked every day without a single hitch, and every one of them got away so easily and quickly that roads leading into Cleveland were often blocked for hours.

Every year the great aircraft exposition and the National Air Race program provide high marks of aviation progress. All these superlatives were employed to describe the National Air Races last year in Los Angeles and the Detroit aircraft show in April. They held true in both cases, but something stronger should be supplied to tell the story of the Cleveland opus. The thousands of members of the aviation industry who attended agree that nothing like it has ever been seen in America before, and no such variety of attractions has ever been offered to the visitor at any aeronautical event anywhere. Formations of blimps, Col. Lindbergh leading a Navy flight, the queer autogiro, the *Los Angeles*, women derby racers, gliders, amphibions, stunters and parachute droppers all provided their share of interest.

Singling out the high points of an offering like this is a



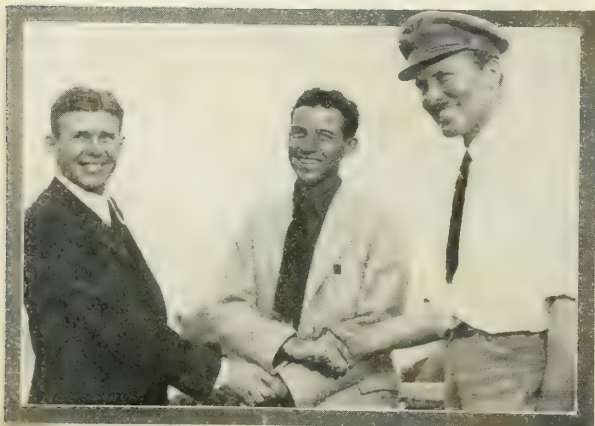
Three famous fliers at the races: left to right, Lieut. Al Williams, Col. Charles Lindbergh, Lieut. Jimmy Doolittle

matter of opinion. The women's cross-country derby got more newspaper space, perhaps, than any other one event. It convinced the country that women need no further assistance from anyone in tackling difficult journeys by airplane. The skeptics who waited to say "I Told You So" were disappointed. The fair entrants took a longer time to bring their planes from Santa Monica to Cleveland than leading men pilots would have required, but their flying time was pretty good, considering everything. In some other derbies it was not exceeded by men pilots under similar conditions.

The "mystery" Travel Air monoplane was undoubtedly the most outstanding development among racing planes. As long as the National Air Races result in the introduction of such advanced designs, they will remain the most important event in the aeronautical calendar. "Doug" Davis easily defeated everything the Army and Navy could offer, and demonstrated a degree of maneuverability for his craft that does not seem to be matched by either of the military services. In view of the fact that this was the first time that a commercial airplane has defeated military planes in the free-for-all race, it focuses attention on the whole matter of America's status in pursuit aviation and matters pertaining to radical changes in design which might help the Army and Navy keep up with progress.

This attention to pursuit ships was intensified by the hair-raising exhibition given by the Canadians in their three all-metal Siskin fighters. Nearly every critic who witnessed the breath-catching evolutions of these three Canadian gentlemen was of the opinion that they have attained an admirable skill in stunting, though some believed that their stunting at low altitudes directly over the grandstands was thrilling more because it was dangerous than because it was skillful. The Canadian pilots performed as individuals instead of in formation. Most of their exhibition took place a few feet above the spectators' heads. They looped, dove and rolled right down on top of all the straw hats in the bleachers. The Canadians assert that this type of airplane is designed for high altitudes and is not at its best close to the ground, which ought to give it a remarkable performance at about 15,000 feet.

The Australian pursuit races for women gave those who sat near the home pylon an excellent opportunity to witness the comparative skill of men and women pilots. Phoebe Omilie in particular seemed to be gifted in her ability to get around the pylon in a matter of a few seconds in her diminutive Warner-powered Monocoupe. Gladys O'Donnell in a Whirlwind Waco Taper-Wing followed the prac-



Participants in the Non-Stop Derby: left to right, Lee Schoenhair, Henry J. Brown, who won the race, and Capt. Roscoe Turner



tice of diving at the pylon in a steep bank followed by a momentary climbing turn, frequently losing about thirty feet of altitude in the turn. Lady Heath was the closest pylon-cutter among the ladies, seldom missing it by more than twenty or thirty feet and losing considerable altitude in the process.

The matter of Mr. Charles (Speed) Holman's taking liberties with a dignified Ford trimotor still remains one of the big thrills of the week. This was not the first time a Ford has been looped nor the first time Holman had done it with one of the corrugated metal monsters. But, according to Mr. Stout, it was the first time one of these ships had been flown on its back. It was also the most spectacular exhibit that has ever been successfully attempted with a Ford, and aside from the 100,000 spectators on this occasion, very few persons in the country have ever seen elephantine evolutions of this kind. One loop followed another; Holman stopped at the top of one of them and flew the Ford on its back for several minutes; put it through wing-overs and steep climbs and generally behaved as if he were flying a Curtiss Hawk.

Messrs. Williams and Doolittle, not to be outdone, put on extraordinarily skillful exhibitions in specially equipped stunt ships. That slow roll of Williams' seems one of the most beautiful and graceful maneuvers possible. He flew all around the airport upside down, climbed, banked correctly on the turns, and came in to land in this position, turning over right-side up only a few feet above the ground. Doolittle, meanwhile, had taken a Curtiss Hawk five miles behind the airport for a little practice and was mildly annoyed when it shed its wings a few thousand feet above

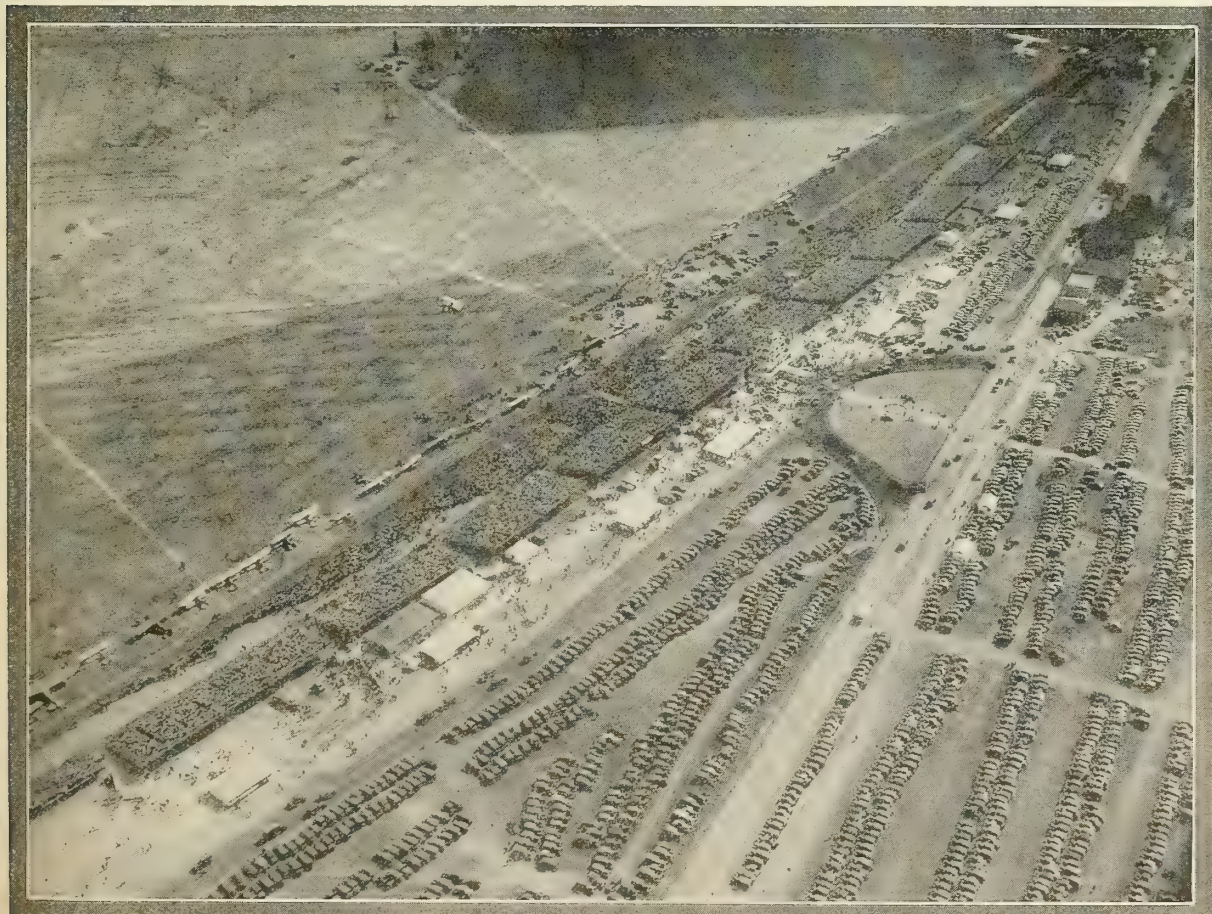


The winner of the Free-for-All Race: the Travel Air "Mystery" ship

a quiet farm. He came down in a parachute, sauntered into the Army building and asked for another airplane, and put on a dazzling exhibition a short time after.

In the city, the Municipal Auditorium and its annex were crowded with handsome airplane, engine and accessory exhibits. Hotels were taxed to capacity. Even pedestrian traffic on the streets was noticeably increased by the visiting thousands.

Inside the exposition gates, observers noted the increasing tendency toward higher horsepower and smoother lines in the design of most large airplanes. An example is the "flying freight car" displayed by the General Airplane Company, which has an elliptical fuselage somewhat similar to the Lockheed, made of duralumin and riveted to a series of trussed frames. It has a wide parasol upper wing and a tiny stub wing underneath, in addition to a freight capacity of 2,000 pounds. The plane is powered with a Hor-



General view of the crowded grandstands and thousands of parked motor cars at Cleveland Airport during the National Air Races





U. S. Army Air Corps Photo

### The Navy dirigible "Los Angeles" and the autogiro in flight at Cleveland during the National Air Races

net engine with a new Venturi cowling, the builders promising a speed of 135 miles per hour with full load.

In some previous exhibits there has been no opportunity to display large trimotored craft in the exhibit hall. In Cleveland, however, both the new series Ford and the Fokker F-10 were on view inside the auditorium annex. On the concourse outside, the 18-passenger Boeing transport made its initial public appearance and was inspected by nearly every visitor. The Curtiss Condor, also of 18-passenger capacity, did not appear at the auditorium, but was on view at the airport daily. The Boeing transport displayed a new type of Venturi cowling on its three Pratt and Whitney Hornets, which cowling in various forms is to be seen in quite a number of newly-developed models using air-cooled engines.

From the largest trimotor to the tiny Heath Baby Bullet, airplanes representing every branch of aviation construction were on display. Inland Sport offered a side-by-side parasol monoplane of unique design. Great Lakes exhibited a twin-motored seaplane powered by two Cirrus Mark III engines. Prominent manufacturers brought their latest models, providing a thorough summary of the modern trend of design which could not have been acquired in a year's travel among the country's airports.

The accessory displays were exceptionally complete and attractive, providing a great fund of information to those in the industry. New parts, changed methods, more efficient equipment and greater results from existing material were shown by manufacturers of aircraft equipment and supplies. Anyone who analyzed the products displayed could not but be impressed by the certainty of vital improvement in future aircraft.

Although the Cleveland race meet and exhibition broke all records for attendance, number of exhibits, public enthusiasm and downright value to the industry, it appears likely that next year will see the matter handled a little differently. Exhibitors who had spent many weeks of time and thousands of dollars preparing their displays at the Auditorium complained that most of the men they wanted to reach were out at the airport watching the races. Attendance at the exposition was not particularly gratifying, and possibly in the future we will see the National Air Races held at one time and the major exposition of the year held at another.

But if this condition occurs, nothing will ever take the place of that ten days at Cleveland. Perhaps never again will so much of interest be crowded into a single aeronautical event. Everyone who attended will carry lasting memories of the days between August 24th and September 3rd, 1929, when he saw the aeronautical progress of the United States on display at Cleveland.

## COMPLETE RESULTS OF EVENTS AT THE NATIONAL AIR RACES

### Women's Derby

Finish	Pilot	Plane	Motor	Time
DW-1	Louise Thaden	Travel Air	Wright J-5	20:02:02
DW-2	Gladys O'Donnell	Waco 10	Wright J-5	21:21:43
DW-3	Amelia Earhart	Lockheed Vega	Wright J-5	22:12:42
DW-4	Blanche Noyes	Travel Air	Wright J-5	24:33:58
DW-5	Ruth Elder	Swallow	Wright J-5	28:15:14
CW-1	Phoebe Omlie	Monocoupe	Warner	25:10:36
CW-2	Edith Foltz	Eaglerock Bullet	Kinner	41:37:41
CW-3	Keith Miller	Fleet	Kinner	52:24:24
CW-4	Thea Rasche	Gipsy Moth	D. H. Gipsy	64:35:36

### All-Ohio Derby

Finish	Pilot	Plane	Motor	Time
1	Lewis Love	Davis V-3 Monoplane	LeBlond	4:43:15
2	H. Speer	Barling	Genet	5:00:55
3	Vernon L. Roberts	Monocoupe	Velie	5:07:43

### Miami-Miami Beach to Cleveland Derby

Finish	Pilot	Plane	Motor	Time
B-1	Robert E. Dake	American Moth	Warner	13:06:02
B-2	Chas. W. Meyers	Trainer 2T2	Cirrus	13:10:58
B-3	C. A. Burrows	Fleet	Kinner	13:27:33
B-4	Frank T. Courtney	Gipsy Moth	Gipsy	14:04:16
C-1	Geo. E. Halsey	Ken-Royce	Challenger	12:42:04
C-2	J. Carroll Cone	Command-Aire Sport	Challenger	13:26:34
C-3	E. Z. Newson	Air Boss	Wright J-6	14:28:48
D-1	Earl Rowland	Cessna	Warner	12:30:41
D-2	Leslie H. Bowman	Monosport	Kinner K-5	12:39:32
D-3	C. D. Bowyer	Cessna	Comet	12:54:10

### Philadelphia to Cleveland Derby

Finish	Pilot	Plane	Motor	Time
D-1	Errett Williams	Bullet	Wright J-6	6:31:31
D-2	Ike Stewart	Monocoupe	Wright J-5	7:29:21
D-3	Howard Young	Bellanca CH	Wright J-6	7:30:09
F-1	J. Wesley Smith	Bellanca CH	Wright J-5	6:39:03
F-2	S. A. Riley	Travel Air	Wright J-6	7:49:52
F-3	R. P. Hewitt		Wright J-6	9:00:05

### Portland, Oregon to Cleveland Derby

Finish	Pilot	Plane	Motor	Time
1	T. H. Wells	Travel Air	Wright J-5AB	14:44:10
2	Tex Rankin	Waco Taper Wing	Wright J-6	15:26:24
3	Sydney Hall	Travel Air	Wright	17:26:00
4	W. H. Emery	Travel Air	Wright J-6	17:42:13
5	G. H. Eckerson	Waco Taper Wing	Wright J-5A	16:14:02

### Oakland to Cleveland Derby

Finish	Pilot	Plane	Motor	Time
1	Loren W. Mendell	Buhl		17:43:16
2	W. J. Barrows	Fairchild 71		17:46:45
3	J. O. Donaldson	Travel Air		18:17:18

### Non-Stop Derby, Los Angeles to Cleveland

Finish	Pilot	Plane	Motor	Time
1	Henry J. Brown	Lockheed Air Express	Hornet	13:15:07
2	Lee Shoenhair	Lockheed Vega	Wasp C	13:51:10

### Rim of Ohio Derby

Finish	Pilot	Plane	Motor	Time
1	J. O. Donaldson	Travel Air	Wright J-6	4:48:11
2	W. J. Barrows	Fairchild 71	Wasp	4:53:47
3	Loren W. Mendell	Buhl	Wright J-6	5:03:09

### Canadian Derby

Finish	Pilot	Plane	Motor	Time
1	K. E. Whyte	D.H. Moth	Gipsy	3:00:26
2	R. C. Guest	D.H. Moth	Gipsy	3:02:59
3	G. M. Irwin	D.H. Moth	Gipsy	3:14:26

### COMMERCIAL

Finish	Pilot	Plane	Motor	Time
1	Herbert St. Martin	Travel Air	Wasp	2:10:24
2	W. J. E. Johnston	Buhl	Wright J-6	2:13:14
3	James G. Crang	Buhl	Wright J-5	2:18:09

## CLOSED COURSE EVENTS

### EVENT 1

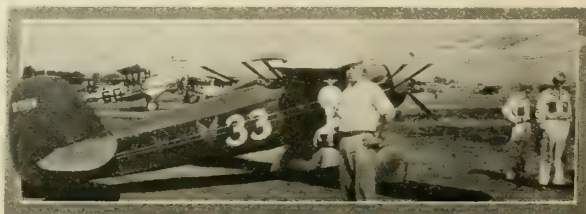
Open to women pilots only. (Two first place awards made by referet.)

Finish	Pilot	Plane	Motor	Speed
1	Phoebe Omlie	Monocoupe	Warner	112.37
2	Keith Miller	Fleet	Kinner K-5	98.73
1	Lady Mary Heath	Great Lakes	Am. Cirrus	96.17
3	Blanche Noyes	Great Lakes	Am. Cirrus	85.12

### EVENT 2

#### Civilians Light Plane Race

Finish	Pilot	Plane	Motor	Speed
1	E. B. Heath	Heath Parasol	Bristol Cherub	62.91



Lewis Love and the Davis racer, All-Ohio Derby winner

## EVENT 3

Civilians only (Experimental Ship Race)

Place	Pilot	Motor	Speed	Plane
C-1	Douglas Davis.....	Travel Air low-wing monoplane...	Chevrolet-6	113.38
C-2	E. B. Heath.....	Heath Baby Bullet...	Bristol Cherub...	105.40
C-3	H. A. Speer.....	Barling NB-3.....	Genet	105.12
D-1	H. S. Myhres.....	Simplex Monoplane...	Wright J-6.....	147.01

## EVENT 4

U. S. Marine Squadron Race

Finish	Pilot	Plane	Motor	Speed
1	Lt. Boyden.....	Curtiss Hawk	Wasp	142.88
2	Lt. Bryce.....	Curtiss Hawk	Wasp	141.88
3	Lt. Belcher.....	Curtiss Hawk	Wasp	140.85
4	Lt. Heagen.....	Curtiss Hawk	Wasp	139.73

## EVENT 5

275-Cubic-Inch Piston Displacement (Civilians Free-for-All)

Finish	Pilot	Plane	Motor	Speed
1	E. B. Heath.....	Heath Bullet	Bristol Cherub...	109.46
2	H. A. Speer.....	Barling NB-3	Genet	105.93
3	Louis Love.....	Davis Monocraft...	LeBlond	105.60
4	Vernon Roberts.....	Monocoupe	Velie	100.32

## EVENT 6

Attack Plane Race (Pilots of Army Attack Groups)

Finish	Pilot	Plane	Motor	Speed
1	Lt. Delmer.....	Curtiss Falcon	D-12	140.20
2	Lt. Kinzie.....	Curtiss Falcon	D-12	138.84
3	Lt. Ziegler.....	Curtiss Falcon	D-12	136.14

## EVENT 7

Pursuit Plane Race (Pilots of Army Pursuit Groups)

Finish	Pilot	Plane	Motor	Speed
1	Lt. Wurt Smith.....	Curtiss Hawk	D-12	152.17

## EVENT 8

Civilians OX-5 Race

Finish	Pilot	Plane	Motor	Speed
1	Geo. H. Shealey.....	Travel Air	OX-5	104.54
2	Wm. E. Winkle.....	Bird	OX-5	100.74
3	F. H. Spencer.....	Robin	OX-5	98.22
4	A. C. Chester.....	Travel Air	OX-5	97.41
5	Lewis Meister.....	Robin	OX-5	95.76

## EVENT 9

Civilian Race (510-Cubic-Inch Piston Displacement)

Finish	Pilot	Plane	Motor	Speed
1	Vernon L. Roberts.....	Monocoupe	Warner	129.18
2	R. T. Quinby.....	Monocoupe	Warner	128.09
3	C. D. Clark.....	Travel Air	Chevrolet	126.14
4	Chas. W. Meyers.....	Great Lakes	Am. Cirrus...	122.00
5	W. G. Moore.....	Inland Sport	Warner	116.73

## EVENT 10

Cleveland to Buffalo Efficiency Race

Place	Pilot	Plane	Motor	Speed
1	Geo. Haldeman.....	Bellanca	Wright J-6.....	130.22
2	J. W. Smith.....	Bellanca CH 300	Wright J-5.....	125.20
3	Otis Beard.....	Fairchild 71	Wasp	138.22
4	H. P. Young.....	Bellanca	Wright J-6.....	109.83

Note: The efficiency formula used in the above race was as follows:

$$\frac{\text{Pay load} \times (\text{miles per hour})^3}{\text{Gas consumed}} = \text{figure of merit}$$

## EVENT 11

Contest for Breaking World's Solo Endurance Record

Finish	Pilot	Plane	Motor	Duration
1	T. G. Reid.....	Emco	Wright J-6.....	38 hours

## EVENT 12

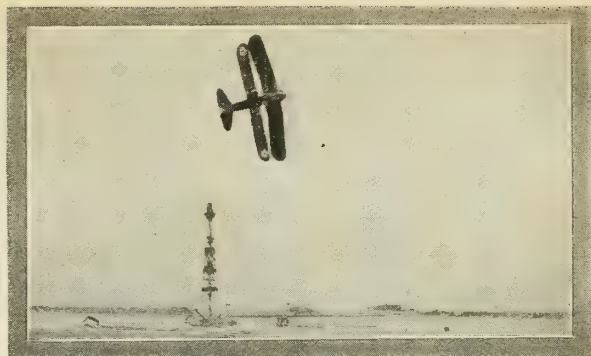
Civilian Relay Race

Place	Team	Plane	Motor	Speed
1	D. H. Davis.....	Travel Air	Curtiss OX-5.....	96.75
	J. F. Gill.....			
	C. E. Clark.....			
	H. McGouchey.....			
2	W. D. Winkle.....	Bird	Curtiss OX-5.....	98.58
	W. N. Raymond.....			
	H. G. Bissinger.....			
	K. F. Lovejoy.....			
3	Arthur Chester.....	Travel Air	Curtiss OX-5.....	90.80
	S. Hopkins.....			
	Clark Smith.....			
	George Shealey.....			

## EVENT 13

Civilian Race (720-Cubic-Inch Piston Displacement)

Finish	Pilot	Plane	Motor	Speed
1	Errett Williams.....	Eaglerock Bullet...	Wright J-6.....	134.58
2	Vern. L. Roberts.....	Monocoupe	Warner	128.84
3	R. T. Quinby.....	Monocoupe	Warner	128.15
4	C. D. Bewyer.....	Cessna	Comet	126.61
5	Geo. Halsey.....	Ken-Royce	Challenger	123.98



U. S. Army Air Corps Photo

Banking around the home pylon in the Attack Plane Race

## EVENT 14

Race for Observation Type of Airplane  
(Liberty Engine Builders' Trophy)

Finish	Pilot	Plane	Motor	Speed
1	Lt. John Gill.....	O2H	Liberty	132.72

## EVENT 15

Civilian Light Plane Speed and Efficiency Contest

Finish	Pilot	Plane	Motor	Speed
1	H. A. Speer.....	Barling	Genet	105.20
2	Wm. Burns.....	Heath Bullet	Bristol	104.68
3	B. W. Diggle.....	Inland Sport	LeBlond	100.67
4	Lewis Love.....	Davis Highwing	LeBlond	91.41

## EFFICIENCY

Place	Pilot	Plane	Motor	Merit Points
1	H. A. Speer.....	Barling	Genet	150.61
2	D. F. Zimmerly.....	Barling	LeBlond 60	*909.84
3	B. W. Diggle.....	Inland Sport	LeBlond	300.35
4	Wm. Burns.....	Heath Bullet	Bristol	282.59
5	Lewis Love.....	Davis Highwing	LeBlond	153.74

\*Two first prizes awarded in Efficiency Contest by referee because Pilot Zimmerly was misthroughed relative to pay load, and was also flagged down at end of 9th lap.

## EVENT 16

Final Contest, Sept. 2

National Parachute Jumping Contest

First, Joe Crane, \$500; second, Dale F. Dryer, \$300; third, Bennie Rowe, \$200.

## EVENT 17

Civilian Open Ship Race (800-Cubic-Inch Piston Displacement)

Finish	Pilot	Plane	Motor	Speed
1	C. W. Holman.....	Laird	Wright J-4.....	150.61
2	T. A. Wells.....	Travel Air	Wright J-5.....	147.33
3	H. S. Myhres.....	Simplex	Wright J-6.....	145.56
4	I. M. McConaughy.....	Travel Air	Wright J-6.....	142.60
5	Fred Lund.....	Waco-10	Wright J-6.....	140.74

## EVENT 18

Civilian Air Transport and Efficiency Contest  
(For Detroit News Air Transport Trophy)

Finish	Pilot	Plane	Motor	Speed
1	Geo. Haldeman.....	Bellanca	Wright J-6.....	119.97
2	J. W. Smith.....	Bellanca	Wright J-5.....	113.74
3	C. D. Chamberlin.....	Crescent Cabin	Wright J-6.....	110.19

## EFFICIENCY

Place	Pilot	Plane	Motor	Merit Points
1	Geo. Haldeman.....	Bellanca	Wright J-6.....	316.02
2	C. D. Chamberlin.....	Crescent Cabin	Wright J-6.....	202.49
3	J. W. Smith.....	Bellanca	Wright J-5.....	194.17

## EVENT 19

Civilian Cabin Ship Race (800-Cubic-Inch Piston Displacement)

Finish	Pilot	Plane	Motor	Speed
1	R. W. Cantwell.....	Lockheed	Wasp	152.27
2	R. Turner.....	Lockheed	Wasp	150.15
3	J. W. Smith.....	Bellanca	Wright J-6.....	135.81
4	H. D. Young.....	Bellanca	Wright J-6.....	125.93
5	R. G. Lockwood.....	Fairchild 71	Wasp	123.83

## EVENT 20

Multi-Motored Ship Race

Finish	Pilot	Plane	Motor	Speed
1	Waldo Waterman.....	Bach	Hornet and 2 Wright J-5s...	136.41
2	Wm. M. Brock.....	Bach	Hornet and 2 Wright J-6s...	134.46
3	M. Gorton.....	Fokker F-10	3 P&W Wasps...	123.00

## EVENT 21

Navy Fighting Plane Race

Finish	Pilot	Plane	Motor	Speed
1	W. E. Arnold.....	Boeing F2B	Wasp	127.58
2	C. Ironmonger.....	Boeing F2B	Wasp	126.97
3	T. C. Sutton.....	Boeing F2B	Wasp	126.50
4	Langford.....	Boeing F2B	Wasp	126.08

## EVENT 22

Australian Pursuit Race (\*Handicap Race)

Place	Pilot	Plane	Motor	Speed
1	C. C. Jakway.....	Gipsy Moth	Gipsy	*100.65
2	A. J. Davis.....	Waco 10-T	Wright J-5	136.82
3	H. S. Myhres.....	Simplex Monoplane...	Wright J-6	149.17
4	E. J. Detmer.....	Travel Air	Curtiss OX-5	103.46
5	A. P. Krapish.....	Gipsy Moth	Gipsy	114.12



Mrs. Phoebe Omlie and the Moncoupe which she flew to first place for the light plane class in the Women's Air Derby





Errett Williams and trophies he won flying an Eaglerock Bullet

## EVENT 23

National Guard Planes

Finish	Pilot	Plane	Motor	Speed
1	John K. Gill	Douglas O-28	Liberty	132.10
2	Claude A. Owens	Douglas O-28	Liberty	130.91
3	Wilson V. Newhall	Douglas O-28	Liberty	129.97

## EVENTS 24 AND 25 CANCELLED

## EVENT 26

Free-for-All Speed Contest

Finish	Pilot	Plane	Motor	Speed
1	Doug. Davis	Travel Air	Wright J-6	194.90
2	R. G. Breene	Curtiss P-3-A	Wasp	186.84
3	Roscoe Turner	Lockheed	Wasp	163.44

## EVENT 27

Dead Stick Landing Contest for Men Pilots

Date	Place	Pilot	Plane
August 25	1	Orin Welsh	Swallow Training.
	2	Ralph Wesinger	Eaglerock.
	3	Larry Ruch	
August 26	1	Verne D. Christen	Eaglerock.
	2	Orin Welsh	Swallow TP.
	3	S. F. Hopkins	Waco-10.
August 27	1	P. D. Cramer	Curtiss Robin.
	2	Arthur C. Chester	Travel Air.
	3	Verne D. Christen	Eaglerock.
August 28	1	Arthur C. Chester	Travel Air.
	2	Verne D. Christen	Eaglerock.
	3	Orin Welsh	Swallow TP.
August 29	1	Arthur C. Chester	
	2	Orin Welsh	
	3	Pat Twohey	

August 30, 31 and Sept. 1.	1	Al Krapish	Gipsy Moth.
	2	Wesley N. Raymond	Gipsy Moth.
	3	Verne D. Christen	Eaglerock.
September 2	1	Wesley N. Raymond	Air Boss.
	2	Glen L. Messer	
	3	Clark L. Smith	

## EVENT 28

Ladies' Race

Finish	Pilot	Plane	Motor	Speed
1	Glady's O'Donnell	Waco Taper Wing	Wright J-6	137.60
2	Louise Thaden	Travel Air	Wright J-5	131.43
3	Blanche Noyes	Travel Air	Wright J-5	127.77

## EVENT 29 CANCELLED

## EVENT 30

Australian Pursuit Race for Women (Friday, Aug. 30)—\*Handicap Race

Place	Pilot	Plane	Motor	Speed
1	Glady's O'Donnell	Waco Taper Wing	Wright J-6	*138.21
2	Thea Rasche	Gipsy Moth	Gipsy	97.31
3	F. Harrell	Gipsy Moth	Gipsy	112.24

## EVENT 31

Australian Pursuit Race for Women (Sunday, Sept. 1)—\*Handicap Race

Place	Pilot	Plane	Motor	Speed
1	Thea Rasche	Gipsy Moth	Gipsy	*99.72
2	Louise Thaden	Travel Air	Wright J-5	136.83
3	Glady's O'Donnell	Waco	Wright J-6	137.63

## EVENT 32

Australian Pursuit Race for Men (Sunday, Sept. 1)—\*Handicap Race

Place	Pilot	Plane	Motor	Speed
1	Clyde C. Jakway	Gipsy Moth	Gipsy	*98.78
2	P. D. Cramer	Curtiss Robin	OX 5	93.71
3	H. S. Myhres	Simplex Monoplane	Wright J-6	149.72
4	I. M. McConaughy	Travel Air B11D	Wright J-6	145.22
5	A. H. Johnston	Gipsy Moth	Gipsy	113.91

## EVENT 33

Balloon Bursting Contest for Men

Date	Place	Pilot	Plane
Tuesday, August 27	1	Orin D. Welsh	Swallow.
August 28	1	Verne D. Christen	Eaglerock.

## EVENT 34

Civilian Aerobatic Exhibition

Pilot	Plane	Motor
Freddy Lund	Waco Taper Wing	Wright J-5

## EVENT 35

Speed and Efficiency Contest for Aviation Town and Country Club Trophy

Finish	Pilot	Plane	Motor	Speed
1	E. Williams	Eaglerock Bullet	Wright J-6	133.75
2	V. L. Roberts	Monocouch	Warner	129.43
3	R. T. Quinby	Monocouch	Warner	125.57

## EFFICIENCY

Place	Pilot	Plane	Motor	Merit Points
1	G. W. Haldeman	Bellanca	Wright J-6	253.19
2	C. D. Bowyer	Cessna	Comet	141.31
3	R. T. Quinby	Monocoupe	Warner	118.40

## RESULTS OF THE GLIDER CONTESTS

## Event Number One

**D**ISTANCE, shock-cord launching method, PTGs only. (Absolutely level ground.) Distance to be measured from a line with the nose of the glider on the line to the point where the glider first touches the ground. Chief Judge: Ray Cooper assisted by the announced members of the Contest Committee and also by Mr. Luke Christopher, secretary of the contest committee of the National Aeronautic Association. Measuring tape in charge of Mr. B. Russell Shaw, airport engineer of St. Louis.

## Results:

Jackson Glider Club, Elmer Westerland, pilot, flying new steel fuselage PTG belonging to and built and owned by Joseph Paulus and E. Westerland. Distance: 592 feet.

Cincinnati Glider Club, William Fowler, pilot, flying PTI built by Gliders, Inc., and owned by club. Distance: 497 feet.

Pioneer Gliding and Soaring Society, Orion, Mich. Oscar Kuhn, RRG 2nd. CI. pilot (Germany) flying PT2 of Gliders, Inc. Distance: 479 feet, 6 inches.

Titan Aircraft Club University of Detroit. Kenneth H. Carr, pilot. Flying steel fuselage PTG built by U. of D. students. Distance: 391 feet.

Glider section, Aeronautical Society of the University of Michigan, Robert B.

Evans, pilot, flying PT2 of Gliders, Inc. Distance: 370 feet.

Cleveland Glider Club, William Strauss, pilot, flying PT2 built by H. Alfaro of Cleveland, owned by club. Distance: 365 feet, 3 inches.

Pioneer Gliding and Soaring Society, Orion, Mich. F. M. Blunk, pilot, flying PT2 of Gliders, Inc., Distance: 354 feet.

W. C. Whitmar, Grand Rapids, Mich. E. D. Palmer, pilot, St. Joseph, Mich., flying PTG built and owned by Whitmar-Leonard, Inc. Distance: 333 feet, 6 inches.

Byrd Club, Sioux City, Iowa. Ernest Southworth, pilot, flying home-built PTG of club. Distance: 331 feet, 6 inches.

Akron Glider Club, F. A. Loudy, pilot, flying PTG built for club by Baker-McMillen Co. as test ship from N.G.A. plans. Distance: 296 feet.

Note: In all cases but two, twelve men were used on the shock-cord, six on each side. In the two cases, ten men were used. There were two excellent flights (based on general performance and landings), two good flights, five fair flights and one bad one.

## Event Number Two

**Duration: shock-cord launching method—**PTGs only. The time to count from the moment that the ship leaves the ground until moment that the glider touches the

ground. (One shock-cord for the first and second contests was used, loaned by Gliders, Inc. for the purpose. Only one pilot per ship was eligible in these contests due to time limitations, but pilots not having a ship could borrow one previously used by another entry).

## Results:

Cleveland Glider Club; pilot and ship unchanged. Time: 16.45 seconds.

Cincinnati Glider Club; pilot and ship unchanged. Time: 16 seconds.

Titan Aircraft; pilot and ship unchanged. Time: 15 seconds.

Akron Glider Club. Same ship; pilot, L. B. Hutchinson. Time: 14.1 seconds.

H. Alfaro, flying ship of his own manufacture. Time: 13.8 seconds.

Jackson Glider Club; pilot and ship unchanged. Time: 13 seconds.

Pioneer Gliding and Soaring Society. Pilot Kuhn in same ship. Time: 12.8 seconds.

Glider Section, Aeronautical Society of the University of Michigan. Same pilot and ship. Time: 12.4 seconds.

Pioneer Gliding and Soaring Society. Pilot Blunk in same ship. Time: 9.5 seconds.

Byrd Club of Sioux City, Iowa. Same ship; pilot, Creel E. Meyer. Nose-dive and wash-out. Pilot uninjured. Time: 7 seconds.

(Continued on page 90)

# AIR—HOT AND OTHERWISE

PERHAPS we were wrong, but for five years we have been saying that the Navy—yes, that of the United States—is the greatest propaganda bureau in the world. Bar none. And now the Navy, just to prove us right, develops the Shearer "incident." If this were described in connection with anything except one of the branches of the Government of the United States it would be included by the press in those sections of their pages devoted to cheap criminal news.

We have been hammering at certain Naval tendencies unceasingly, and our hammer-arm has not yet gone tired. Exercise makes muscle swell and ripple underneath its skin. Talk about your village blacksmith!

Maybe some aircraft manufacturers who, in 1924 and 1925, stripped their advertising from this magazine because they were making a few dollars out of the Bureau of Aeronautics and lacked the courage to speak up openly in the interests of the American business in general, fearing that the old line Navy officials would cause them to lose the business by not defending their rights as citizens by helping us in the fight that has let the industry wax fat and strong, are now sorry that they were so timid.

William B. Shearer—not AERO DIGEST—has fired the gun which may have made them sorry, even though he fired it with his own ends in view and now finds the ends principally affected to be those nautically known as "beam ends"—his.

Before the Senate investigation, which was the child of the fine heat of Borah's indignation, comes to its end the United States will know the facts we so frequently have hinted: not only that we believe the Naval gang in Washington has conducted secret (and therefore improper) propaganda for big fleets, but an anti-patriotic and therefore (for a fighting branch of the American Government) even more improper campaign against equipping our defense with aircraft, the only weapon which, can be effective in these days, as the Navy knows perfectly well.

Shearer, who was, according to the revelations he himself has made in his suit for pay as super press agent, hired and serving to impair the nation's safety, is the same individual who rushed into court (at behest, doubtless, of his Navy friends and the big business men who are well paying guests in the palace of their friendship) to swear out an injunction intended to prevent the Army's airplanes from bombing the U. S. *Washington's* hulk off the Virginia Capes. His effort failed. Even the man whose skill was great enough, and whose pull was strong enough to thwart a great international effort held in a foreign capital by the nations of the world, could not stay the flight of United States Army planes nor keep the fingers of the men who manned them off the bomb releases. The net result of his endeavor is that we must suffer international ridicule because of his boastful, mercenary statements that he tried to do so—and has not yet been stood against a wall with pointed rifles in front of him.

It was General William Mitchel who prevented Shearer from achieving victory in this attempted trick to hamper honest efforts to give the nation adequate defense; and those same aircraft manufacturers whom we lost, but do not regret, as advertisers in this magazine, openly fought that plucky, public-spirited soldier in his endeavor to make

*Now, Shear Shearer!*

*Air Races Prosper*

*Exposition Flops*

By Frank A. Tichenor

known the truth about Shearer, his shameful employers and in general the new shame which they had sought to pile on other shames already wrought against the nation.

These same people, who openly fought AERO DIGEST by openly declaring that they would drive this

publication out of business if it did not cease its revelations of Navy propaganda rottenness, are not so cheery now. One of the manufacturers behind this departmental iniquity angrily announced to me, personally, at the N. A. A. convention at the Bellevue-Stratford, Philadelphia, in 1926, that he would withdraw his advertising from these pages if we did not change our policy. I smiled when he emitted the harsh words, and, I must confess, laughed when, a few days later, he actually cancelled. He never has been in our advertising pages since and, what's more, he couldn't get into them.

The investigation which President Hoover promptly instigated will go through, though superhuman efforts may be made to check it, and even the President, clever, patriotic and persistent though he be, will need to watch his step, because it is a sinister fact that the power of the group which employed Shearer, and fights our aeronautical development, almost passes human comprehension. It is to be hoped and we believe that Mr. Hoover, rendered even more determined by this scandalous, truly treasonable situation, will go into the matter to its bottom (even though the dregs be bitter), probing not only Shearer's bold, defiant course as a propagandist, but the black and sinister similar sins committed by the uniformed officers and sworn officials of our Navy.

If Washington were cleansed of propaganda in the Navy and the Navy Department, and those hired by and hiring these definitely traitorous individuals, it would be a finer place for proud patriots to point to as their nation's capital.

If the investigation tells the country who the Navy miscreants are, it will tell the country the identity of aviation's bitterest enemies. And firing squads at sunrise would be none too drastic for the Naval officers and bureaucrats uncovered, or the officials, if any, of the shipbuilding companies who may be proved to have tarred themselves with this especially foul pitch.

JOHN RINGLING, of circus fame, will miss a chance of thrilling with a thrallsome thrill if he does not attend the next air races organized and managed by Cliff Henderson. Ringling is the last and strongest word in the art of running circuses—and a whale, a Jumbo, a ringtailed, seven-horned flying toad. But Cliff Henderson! He's every word in the whole dictionary that means energy and showmanship as applied to aeronautics and its appurtenances. In fact, all that Mr. Barnum, Mr. Bailey, the Brothers Sells and Mr. Ringling put together have ever done under the "big tops" in their ripest, most mature experience of an ancient ballyhoo by way of showmanship, might be multiplied by precious near a hundred without surpassing, without even approaching, that which Cliff Henderson did with the National Air Races out at Cleveland.

When, last year, I saw the show at Los Angeles, I wondered if it ever would be equalled in the East. The Cleveland show surpassed it (Continued on page 288)



# AN AMERICAN'S IMPRESSION OF EUROPEAN AERONAUTICS

By Russell Nicholas

President, Nicholas-Beazeley Airplane Co., Inc.

WHEN the gangplank was dropped in New York Harbor, and I had completed a four weeks' tour of England, France, Germany, Belgium and Holland, where I made a survey and inspection of the aircraft industry and airlines in those countries, I could not help but feel more proud of the aircraft industry we have in the United States than I did before I made my trip.

Of the five countries which I visited, I found England the leader in aeronautics. In England, since the war, the trend of aircraft construction has been toward a more extensive use of metal. The English have given much more thought, time, engineering and expense to metal structures than we have here in the United States. Insofar as design is concerned, however, I could find nothing but conventional types. Apparently most of their time and thought has been devoted to detailed structural members, which when assembled and completed, are still the old conventional fuselage and wing. The English have simply taken the old standard two-spar wood wing with its conventional rib arrangement and duplicated it in a metal structure instead of wood.

In general, the English workmanship on aircraft appears to be far superior to that in this country. The principal reason that the workmanship in England is superior to ours, I believe, is that the wage scale there is only about one half what ours is, with the result that they can afford to be more painstaking and devote more time to a job, inasmuch as experienced and skilled labor can be had at a lower price than in America. Quite naturally, such manufacturing processes would be exceedingly expensive and, I think, from a commercial manufacturing standpoint, entirely prohibitive in this country.

Practically all of the jointed members, wing spars, ribs, trailing edge of ailerons, are riveted joints, very little flame welding being used. High tensile thin gauges of

steel are used almost exclusively.

Another interesting contrast with American practice is the fact that in England wood propellers are used much more extensively than metal. Even on the government ships one sees a great many wood propellers, quite often even without any metal tipping.

A feature which was particularly interesting to me was the fact that the undercarriages on European planes, for the most part, are considerably narrower in tread than ours. I also observed that the English are using more water-

cooled engines than we in America now use.

In France, I observed that the general practice is to cling to wood structures. The trend toward the use of metal in France has been very slight and very slow in development.

In Germany, I found practically everything to be of metal construction. I think there has perhaps been more new development which can be termed radical departure in the use of metal for aircraft in Germany than any other country in the world. The Germans are using some English engines and a few American engines, but for the most

part they are using water-cooled German engines, which, of course, are exceedingly heavy.

Practically all planes used in Holland, I learned, are the Dutch Fokker. The Fokker plant still remains at Amsterdam where it was during the war, and the factory is entirely of wood

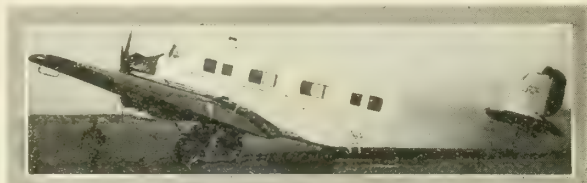
construction. This is the only important aircraft factory in Holland. Inasmuch as the government uses nothing but aircraft manufactured in Holland, Fokkers are about the only ships in the Netherlands air service.

In Belgium, I found only one aircraft factory in existence, the Sadena factory, located at Sadena Field at the edge of Brussels. It is a very small factory, and its production is proportionately small. All the ships this company builds are sold to the Belgium Air Force, which is not a large organization.

From my observation of the manufacturing industry in Europe, my conclusion is that the aircraft market is extremely limited. I feel, for instance, that if we were located in any part of Europe and were manufacturing the finest, most efficient and cheapest commercial airplane in the world, we should have to come to America to look for a market because there are practically no sales possibilities existing over there.

What commercial flying exists is that on the regular, established airlines in all foreign countries. Moreover, all of these airlines are subsidized by the various governments to 80 per cent of operating expense, which means that the governments are virtually guaranteeing to stand any loss which may be incurred in their operations. I also found that probably all of them (Continued on page 260)

*MR. RUSSELL NICHOLAS is well known in the American aircraft industry. As head of the Nicholas-Beazeley Airplane Company, he has for several years engaged in the distribution of aeronautical supplies and accessories on a national scale. More recently his company has undertaken the manufacture of the Barling NB-3 monoplane. His notes on European aviation developments, as he observed them during a recent trip abroad, are interesting as well as instructive.*



An all-metal Junkers monoplane used on German airlines



Waalhaven Aerodrome, municipal airport of Rotterdam, Holland

# A EUROPEAN'S IMPRESSION OF AMERICAN AERONAUTICS

By Henry J. Seyffardt

As told to "Wing Over"

**D**URING my two months' journey throughout the United States, I often heard the question, "How does American aviation compare with European?" This is perhaps the most complex question which one could attempt to answer in a few words, for aviation has become too comprehensive to treat thoroughly in all its aspects; it now concerns the military, the technical, the commercial (including mail, cargo and passenger air transport), airports, regulation, etc. Moreover, it is a science in which so many rapid changes are taking place that it is extremely difficult to do more than give impressions. To do full justice to the subject, one would have to prepare many volumes, a task of such scope as to prohibit its being complete before it would be out of date.

I saw very little of military aviation in America; my actual contact with it was confined to the Curtiss Marine Trophy race at Anacostia, D. C. Consequently, I have little about which to comment. The N.A.C.A. cowlings on Lieut. Tomlinson's winning plane seems to indicate that the United States Navy is receptive to new ideas, for it was only a few months previous to the race that this innovation was introduced. I observed also that Captain Hawks' Lockheed Air Express was equipped with a similar cowling, which indicates that commercial aviation is also quick to adopt practical, new features of design. There seems to be ample evidence, too, that there is close coöperation between military and civil aeronautic interests in regard to technical developments. The new Prestone liquid cooling system, which I understand to be readily available to civilians after development by Army Air Corps engineers, is another example of an attitude which I, as a European, must envy. So much for my necessarily meager impressions of military aviation in the United States.

Without meaning to deprecate the splendid work that is being accomplished, I wonder if there is not some duplication of effort in aeronautical research. I did not see all the laboratories, but I heard of wind tunnels in one section of the country and wind tunnels in another, all of which apparently were doing the same kind of work.

The fundamental difference between American and European flying activities reside in the factors of geography, politics, and economics. The United States consist of tremendous territory with a large population speaking the same language; there is a central government; and the per capita wealth is higher than it is in Europe. Large business and industrial centers are located in all parts of the country, many of them quite remote from others, which means that there will always be a distinct

*HENRY A. SEYFFARDT is of the same nationality as Anthony H. G. Fokker, but unlike the latter, learned his aeronautical engineering in France. As a journalist specializing in aviation, he has studied American development from afar. Recently he concluded a two months' tour of the United States. He presents no brief for either American or European supremacy, but submits some enlightening comparisons which should be helpful to readers on both sides of the Atlantic.*

need for rapid transportation. Therein lies the obvious reason for the great development of American railroads, later automobiles, and now airplanes.

This condition is quite different from that in Europe. The Continent may be said to be divided into two principal sections. The first is comprised of the western countries between the Atlantic Ocean and the line from Stockholm through Warsaw to Constantinople; the other, the new Soviet area, east of this line, which is the "Question Mark" of

Europe with all eyes upon its doubtful "endurance flight."

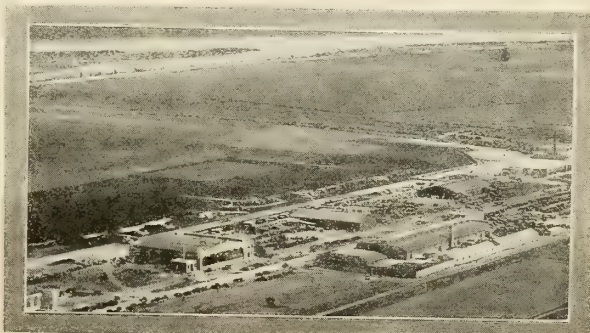
The western part of Europe is in turn divided into many separate countries with different languages and political interests which naturally find it difficult, if not impossible, to coöperate in any way that would be beneficial to the whole. European aviation is tremendously handicapped by the "political egoism" of individual nations. Customs duties, visé-fees, and bureaucratic red tape make difficult the transfer of cargoes and passengers from one country to another. Economic differences are pronounced. A Dutch business, for instance, is confined to Holland and the Dutch colonies, whereas a New York business may have branches throughout the United States. In general, it is true that European business men do

not have large direct interests or contacts in countries other than their own, with the result that air express and mail traffic of Europe is comparatively small. The mail traffic between Stockholm and Rome, for example, is probably less than one-tenth as heavy as that between Boston and Los Angeles.

The spirit of European business is not so hurried as American for the reason that the former is inherently more conservative and does not easily accept new ideas. In the United States every (Continued on page 256)



A fleet of new Ford trimotors for passenger transport



A modern American air terminal, Fairfax Airport





A group of Universal Aviation School students and one of the trimotored Ford monoplanes used for advanced training.

## TRAINING A THOUSAND AIR STUDENTS

**T**RAINING one student or a score of students for aeronautical work is an easy matter—a one-man job, in fact. But, training a thousand students is immensely more difficult. It is an undertaking so extensive that it can be accomplished successfully only with 100 per cent equipment, 100 per cent personnel, and 100 per cent organization.

An interesting example of such comprehensive enterprise is that of the Universal Aviation Schools. Universal is operating ten schools in important cities throughout the Middle West, covering every branch of aviation training.

At the head of the Universal Aviation Schools is Willis B. Haviland, who was a Lieutenant Commander in the Navy during the war, and who previously had served with the LaFayette Escadrille, having received numerous decorations and citations for acts of bravery.

Haviland, with his assistants, is directly responsible for the development of the operating plan of Universal schools. Under this system each school has a complete organization of its own, identical with that of each of the other schools. Haviland's efforts tend chiefly toward direction of the schools as a whole, and toward formulating and putting into effect various policies decided on.

He is, of course, directly under the officials of Universal Aviation Corporation—Dan W. Jones, president, and Colonel Halsey Dunwoody, executive vice president. Universal Aviation Corporation is a unit in the Aviation Corporation, one of the principal big groups in the aeronautic industry. These connections provide the Universal schools a financial foundation which is invaluable in building up the sort of organization required in this work.

An extensive system for enrolling new students has been established by the Universal schools. This part of the organization is divided into two groups—sales by personal contact, and sales through advertising and use of the mails. The former is in charge of J. G. Lamb, and the latter is handled by William Dings. Lamb formerly was sales manager for Universal's school at Minneapolis. Dings, who is officially known as registrar of the schools, formerly managed the Robertson Flying School at St. Louis, which is now controlled by Universal.

Under Lamb the organization chart extends, for enroll-

By  
Donald M. Ewing

ment purposes, right down into each individual school. At each school there is a sales manager, and under him are numerous salesmen. It is the local sales manager's problem to keep his organization producing at all times; it is Lamb's job to see that these local sales managers are keeping up the enrollments.

To keep the routine moving rapidly and smoothly, an extensive system of handling inquiries has been established. A corps of trained letter readers is kept busy every day opening inquiries. These are carefully analyzed and classified according to the type of information desired—whether the applicant

wants to take up flying, wishes to be a mechanic, desires to learn the business side of aviation, or is considering a welding course. Each applicant is given individual attention, and every effort is made to treat his query as a distinct and individual problem. When a student who obviously should not be in aviation seeks to enroll, a frank letter is written giving the reasons why it is thought he should seek some other vocation.

In the actual training side of Universal schools, Paul Paine is supervisor of ground schools. He and Haviland collaborate in working out the general ground pattern, with Captain R. D. Hughes as a liaison man to coordinate flight and ground instruction.

Under these men are the individual schools, each with a manager who, in turn, works in cooperation with a corps of experts in various branches of aviation training. The schools are located at several important airports in order that the student may choose in which part of the country he prefers to be located while in training; whether he desires to live during the training period in a small or a large city, etc.

The first school to be started was at Minneapolis, where Trevor Williams, who is a veteran war pilot, is manager and also in charge of Universal Aviation Corporation's affairs in the central northwest. Because he also has this latter duty, Williams has V. L. Jones, an old-time pilot and barnstormer, as active director of the ground school there. Two schools also under direct supervision of the Minneapolis headquarters have been opened nearby—one at Rochester, Minnesota, and one at St. Paul.



A Universal Fleet training plane coming in for a landing



The second of the Universal schools was that at St. Louis, now in charge of William P. McFail, for eight years one of the country's leading pilots and the pilot of the first ship on the Universal Air Lines. At Marion, Illinois, is another school, under Allen Hagerty. One of the best-known Universal schools is at Kansas City; it is known as the Porterfield Flying School and was only recently acquired by Universal. It was founded by E. E. Porterfield, head of the American Eagle Aircraft Corporation, and now is under Captain L. A. Miller, who earned his wings during the war. Farther west is a Universal school at Oklahoma City, Oklahoma, under Ray Kutterer, a Universal graduate who completed his training a few years ago. At Wichita is another school, founded by E. A. Watkins, president of the Central Air Lines, now a Universal subsidiary, with George MacDonald in charge. Still another Universal school is located in Memphis, Tennessee, with Captain Lloyd Juelson as manager. The farthest east of the Universal schools is the one at Cleveland, Ohio, where David R. McCauley is in charge. McCauley is a well-known pilot and was borrowed temporarily from Universal by the Guggenheim Fund for the Promotion of Aeronautics to conduct experiments in blind flying.

In each of these schools identical instruction is given, and complete, modern flying and ground equipment is used. The standard power equipment consists of the most modern air-cooled engines. All of the old water-cooled jobs have been cast aside except a few that are retained for ground mechanical instruction and a few of the OX-5 type, which are likely to be in use in small ships for a few more years, though considered obsolete for advanced commercial work.

Trimotored equipment also is used in the schools, two Fords being available for the advanced training. Numerous types of cabin ships are available, in addition to the regular small training planes.

Largely because of the efficiency of training in these schools, Universal recently was granted insurance on students while learning to fly. These schools were perhaps the first in the United States to receive such coverage. Previously a student had always been looked on as too great a risk for insurance, but after careful study, a well-known firm of underwriters offered Universal a blanket policy, stating that they were satisfied Universal's system is sufficiently thorough and advanced to eliminate most of the risk involved in training its students. The cost of this insurance is

only \$20 for \$1,000 covering life and disability, and \$45 for \$2,500.

Eight courses are offered in the Universal schools, as follows:

Pilots' ground course, qualifying for Department of Commerce private pilot's license.

Limited commercial course, qualifying for Department of Commerce limited commercial license.

Transport pilots' course, covering every type of flying and qualifying the student to apply for a transport pilot's license.

Day ground mechanics' course, covering six weeks of intensive mechanical study both in the classroom and in actual work at an airport.

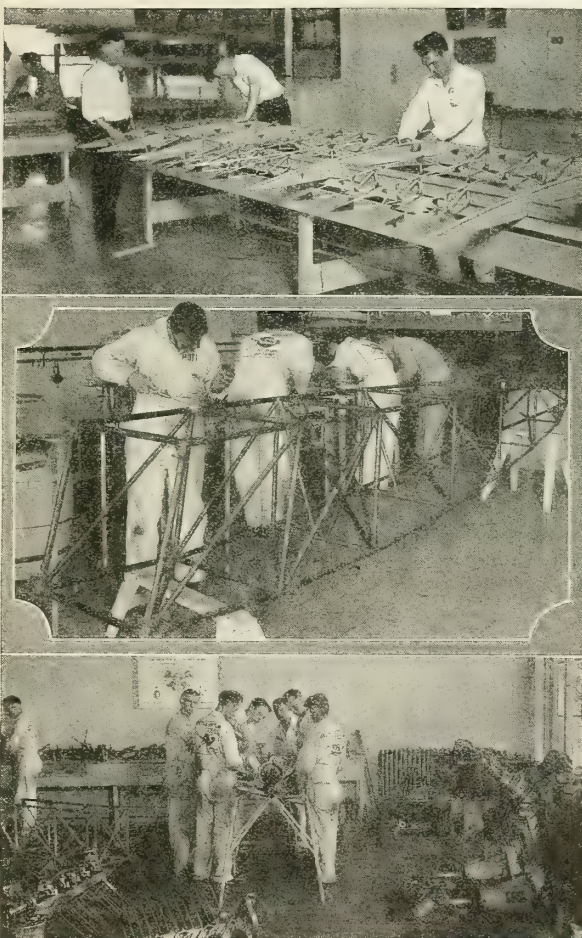
Night mechanics' course, given at downtown buildings in larger cities, not as intensive as the day course, but adequate for men working at other positions in the daytime.

Aviation welding course, also given at downtown laboratories; one of the most popular and unusual of aviation courses offered by the Universal schools.

Aviation business course, covering twenty lectures on all phases of aviation business, each given by a well-known expert in his particular field. Universal was the first in the country to start aviation business courses.

"We have tried to create a school system that is smooth and efficient in each of the three components which are so necessary to success—equipment, personnel and organization," said Mr. Haviland, in commenting on the Universal line-up. "It has taken time to do it, but I believe we have succeeded. The greatest need in aviation today is for experienced personnel and we are seeking to supply that need. Especially is this need found in the business end of the industry. Some years ago we had the idea that the man to fill an aviation executive position had to have been a good pilot. Now we realize that the executive must have two qualifications, executive ability and aviation ability. Neither is sufficient of itself. In other words, an engineman on a train may know everything

in the world about running a train, but be a total loss at running a division of a railroad. There is a big field in aviation today—an unfilled field. No school can conscientiously guarantee to place all of its men. But, we do everything we can to get jobs for our men. Naturally some men show inaptitude in an aviation school, just as some do in their college work, but those who show that they are really good material usually find jobs without much difficulty.



Universal students receiving instruction on wing structure, fuselage welding, and aircraft engine mechanics



# MANUFACTURING THE WACO

**T**HE Advance Aircraft Company, now the Waco Aircraft Company, was founded by E.

By B. D. Spofford

J. Junkin and C. J. Brukner, who began the manufacture of airplanes in 1920 after seven years of study and experiment in the employ of manufacturers of military planes. The Advance Aircraft Company was originally capitalized with only \$12,000, and it is significant that the entire project of the new factory buildings, land, machinery, etc., should have been financed out of earnings on this original capitalization of 100 shares outstanding at the par value of \$100 each. In April, 1928, the company was re-organized under the laws of Ohio and the capital stock was increased to an authorized 62,500 no par shares, all of which was issued to the stockholders of the original Massachusetts company.

In May, 1929, the stock structure was further increased with an authorized 200,000 shares no par, leaving 55,000 shares unissued. Recently a small portion of these shares were sold on the market. Likewise, a minority interest in the Waco Aircraft Company was purchased by the Aviation Corporation, but the control of the company remained in the hands of the president, Mr. Clayton J. Brukner, where it has been since the death of Mr. E. J. Junkin, at which time all of Mr. Junkin's interest had been sold with the exception of one share retained by Mrs. Junkin.

Manufacturing was started in a small brick building at Troy, Ohio. Additions were gradually made until in 1927 the company was manufacturing in seven buildings in that city. The present new factory was built in 1928 on a plot of 115 acres, southwest of and adjoining Troy, where practically all manufacturing operations are carried on under one roof. This main building covers over 80,000 square feet of ground floor space, and is of steel and concrete construction—monitor type of three bays. Windows are of rough actinic glass, used to reduce heat and sun glare. The windows along the top are opened by chains controlling the ventilation. An automatic sprinkler system, com-

bined with an additional deluge system in the paint room, has been installed as a protection against fire. A 75,000-gallon tank tower, in addition to the city water system, supplies the pressure. The plant is equipped for the manufacture of all parts of the airplane, except castings and forgings.

The main office building, which is a two-story structure of brick, houses the executive, engineering and administration departments. Steel sash windows of the double-ventilating type furnish ventilation and light. The floors are of hardwood; the office partitions, of gum wood. All office furniture is steel. A direct wire from Western Union, with a Simplex printing typewriter receiving and sending apparatus, has just been installed.

The sales and delivery hangar, occupying 12,000 square feet of floor space, is of steel and concrete construction, with two eighty-foot openings, the doors of which roll on ball bearings. A concrete apron extends out partway to the flying field. A crew is kept on duty to take care of planes for flyaway delivery and to service the ships of visiting fliers.

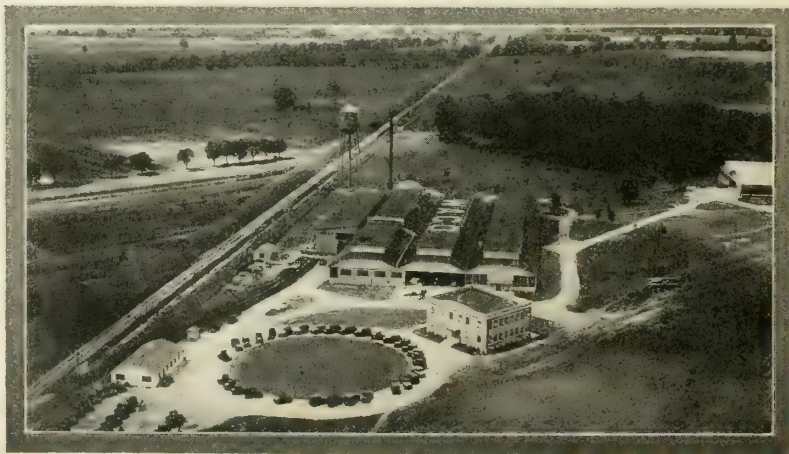
The cafeteria, one of the only two wooden buildings, seats one hundred fifty persons. The other wooden building is for repairs and service parts that are not ordinarily carried in stock. A separate heat and power building is of steel and concrete construction. Two low-pressure boilers provide heat, and two air compressors located in the same building provide air pressure for the paint sprays, etc. The gas generating plants for the oxy-acetylene welding are just outside the main factory building. A separate building, of fireproof construction, is used for paint and oil storage. Storage of gasoline is in 10,000-gallon tanks. Tennis courts, a small golf course and picnic grounds are under construction. The landing field has two sodded runways. The east and west runway is 300 feet wide by 3,000 feet long; the other, which extends north and south, is 1,300 feet wide by 3,000 feet long.

## Machine Shop

The machine shop is operated along the same



Wright-powered Waco 165 straight-wing biplane



Aerial view of the factory of the Waco Aircraft Company at Troy, Ohio



lines as a commercial shop. Work orders are sent through by the Planning Department for the various parts such as wing fittings, aileron tubes, hinges, tension plates which are made up and carried in stock to supply the needs of the assembly departments. Job time cards are kept with the International Time Recording Clock system, and each

job is subject to close inspection. Milling machines, lathes, grinders, punch presses, automatic screw-machines and other such equipment are installed. A "Famous" band saw is used for cutting all steel tubing, and a Long & Alstater shear with a capacity up to 5/16-inch, for bar and plate cutting. A Becher milling machine mills out the ends of the tubes used on the fuselage, cutting them on a radius for better fitting. The nose ribs of duraluminum are stamped out on a Minster press.

All tools and dies are made in the shop. Monarch lathes, American shapers, Cincinnati milling machines, Thompson grinders and similar machines constitute the equipment.

#### Welding Department

Steel tubing of 1025 mild carbon steel, varying from 5/16-inch to 1 7/8 inches in diameter and from .028 to .083 gauge, is used in the construction of the airplane. The fuselage is constructed in three sections; namely, the engine mounting, the forward section that carries the cockpits and the aft section that comprises approximately the rear half of the fuselage. The side walls of the forward section are fabricated on flat jigs, three vertical and four diagonal members being used. The ends of the braces have previously been milled on a curve-cut so that a close contact for welding is made with the adjacent member. Wherever more than two members are joined, they are spline-cut in addition to being curve-cut. The side walls are placed in a box jig where the eight lateral braces and nine diagonal braces are welded. The engine mount, which is made on a separate jig, is welded



Scenes in the Waco factory: upper left, mounting the engine and center section; upper right, forming the cockpit cowling; lower left, second assembly line; lower right, welding the two sections of the fuselage

into place, making it an integral part of the fuselage. No wire bracing of any kind is used, the fuselage being a rigid unit when completed.

The aft section is of four bays with eight vertical and ten diagonal braces on the side walls, and eight lateral braces with seven diagonals. The gauge steel that is

used is, of course, determined by the function of the part.

The two sections are then welded together on a flat jig. Metal bosses are fitted and welded into the holes for engine mounting.

In this department there are over sixty-five welding torches. The oxygen is piped to the various outlets from a battery of twenty cylinders, and the acetylene, which is generated in a separate building, is carried in parallel pipes. Separate control valves are located close to each operator.

After fabrication, all metal parts are thoroughly sand-blasted. The sand blasting not only thoroughly prepares the surface for the metal preservative that is used, but also permits of closer inspection of the work.

#### Woodworking Department

Airplane spruce is received in a semi-finished condition and is subject to four inspections. After machining to size, the inspectors again check it up, initialing and dating each piece. The equipment in this department consists of jigs, rip and rotary saws, planers, shapers, sanders and grinders and other woodworking machinery. Sawdust collectors attached to each machine carry the sawdust through a vertical "cyclone" to the incinerator.

The wings are of the single-panel type and are of two general types—the straight-wing and the taper-wing. The straight-wing was developed from the Aeromarine Z-a section and the taper-wing from the M-6 section. The general construction is of wood, wire and fabric. The front spar measures 1 inch by 4 7/8 inches by 12 feet 9 inches, and the rear spar, 1 1/4 inches by 3 3/8 inches by 12 feet



Upper left, final assembly and rigging; upper right, first and second assembly lines; lower left, applying the fabric cover to the wings; lower right, paint department



9 inches. Neither spar is routed. Six web ribs are  $6\frac{1}{2}$  inches long and  $5\frac{1}{4}$  inches deep, and six shorter ribs, which allow for the attachment of the aileron, are 48 inches long. There are three bays with four compression members, with diagonal bracing of hard wires secured to the spars by double-bolted drag bracing clips. Extra steel plates are also used where there is any tendency to embed in the wood.

The ribs are of a truss design, with upper and lower cap strips of spruce with vertical and diagonal intermediates. At each intersection, gussets of mahogany plywood are glued and nailed on both sides of the rib, assembly being over rigid steel-back assembly jigs of Waco design. The glue used is mixed fresh four times a day, and the placing of all nails has been worked out to get the best results.

The trailing edge is of copper-coated steel, Kawneer V section, squeezed and soldered into place and held with the aid of copper tie strips. The wing tip is made of spruce in four laminations. The aileron mounting is by means of metal hinges, anchored to a false spar. Dural cap strips approximately 12 inches long are spaced between the ribs. All internal fittings, such as aileron fittings, bolts, screws, plates and other metal parts, are cadmium plated, all nails are cement-coated.

Inspection is more rigid than the Government requires, and is made continually throughout the process until final inspection when the wings are finished.

#### The Taper-Wing

The taper-wing has four bays instead of three (as in the straight-wing) with five compression ribs, and tapers in plan as well as depth. The front spar is 6 inches deep at the root, tapering to 4 inches. The rear spar is 5 inches deep, is also tapered, and is set at right angles to the line of flight, whereas the front spar converges. Because of this construction, each individual rib is made over a separate jig, the deepest one being  $7\frac{1}{2}$  inches. A steel tube at the root acts as a compression member. The leading edge is of duraluminum extending back to the front spar, top and bottom. The trailing edge is the same as on the straight-wing; Hartshorn square tie rods are used instead of hard wire, to assure

absolute alignment under the severe usage to which this type of wing is subjected.

#### Center Sections

The taper-wing center section consists of one large bay with two smaller bays, one at each end. Two N-shaped steel tube compression members are used for rigidity, and bracing is with Hartshorn square tie rods. Center section tanks are sometimes installed, in which case solid ribs and members, instead of web, are used for support. The taper-wing center section extends beyond the center section struts to a point where the spar bending moment is zero.

The straight-wing center section is of the single-bay type, with wires for bracing, and has a ply-metal bearing block for tying in the spar to the vertical bolt.

#### Fabric Application

After receiving a coat of varnish as a preservative, the wings and center sections have the fabric covering sewed on. This fabric is Grade A airplane cloth, of long staple Egyptian cotton very close in weave. The coverings are first cut to a pattern and machine sewed, double stitched, and made similar to a slip cover. The cover is slipped over the wing and then tacked and hand sewed in place. Reinforcing tape is sewed around each rib contour. Similar envelopes are made for the center section and tail surfaces and supplied in the same manner.

#### First Assembly

After inspection, the uncovered fuselage is sprayed with a red lead primer, and then a metal preservative, after which it goes to the assembly line. There, specially designed spruce fairings

are taped to the sides and bottom of the fuselage and well shellaced. Tape is stripped along the fuselage wherever the fabric is apt to touch it, as a precaution against the doped surface affecting the preservative used.

A floor board of mahogany plywood is next put in, after which follow in proper sequence, seats, tail skid, safety belts, gasoline tank, instrument boards, controls, cables, firewalls and other equipment.

The dual controls are of the push-pull tube type with fiber tubes for bearing surfaces at points accessible for inspection and greasing.

(Continued on page 270)



Officers of the Waco Aircraft Company: reading from left to right, top row, C. J. Brukner, president and general manager; L. N. Brutus, vice president; R. F. Hardy, chief engineer; center row, left, O. J. Neff, comptroller; right, D. C. Fowler, service manager; bottom row, R. E. Lees, sales manager; W. D. Wigmore, buyer; and B. D. Spofford, advertising manager

# THE EMBATTLED AIR RESERVES

**L**ITTLE by little, the "Old Guard" of the Air Corps Reserve—composed of men who won their wings during the World War—is being driven to its last stand, and extinction. In the eyes of many Reserve officers who attended this summer's active duty camps at Mitchel Field, L. I., the process is being hastened by Official Washington and the Regular Army.

"They are trying to get rid of the Reserves," said more than one of these civilian-soldiers this summer on reporting for two weeks' Army life and learning that word had gone forth for a general "tightening up" on the flying Reserve. "We are too old; they don't want us any longer. It is just as well to get out."

This from men who were in their early twenties when the Armistice was signed and who have constantly kept their hand in or at flying ever since by traveling to and from the nearest Army field at their own expense for monthly or weekly "practice flights." Also from those who have kept even closer contact with aviation through commercial flying jobs. Just the sort who ought to be of immediate value to their country in the event of what our best orators call a National Emergency; but clearly disheartened because of a growing conviction that they are no longer wanted in a service to which they long have been faithful.

The immediate and outstanding cause of discouragement was an announcement at the opening of each two week's camp by Major William Ord Ryan, acting commandant of Mitchel Field, that the War Department had instituted a new policy regarding the Air Corps Reserve. Henceforth, he said, the orders were to "wash out" and bar from further active duty training all Reserve officers not qualified as "Class One Pilots", these being, according to the most recent Army regulations, those Reservists who have demonstrated their ability to fly "service type airplanes."

Now a "service type airplane," so far as Mitchel Field is concerned, means a Curtiss Falcon observation plane, powered with either a D-12 or a Liberty engine, of which more will be said anon. The only other ships available there are Consolidated PT-1's, driven by 1918 Hispano-Suiza motors and classified under the general head, "training type." It ought further to be explained that, since 1928 or possibly as far back as 1927, Reserve fliers have been classified as "Class One" or "Class Two" pilots according to their ability (as determined by the Regular Army officers charged with their supervision) to fly "service" and "training" type airplanes, respectively. Also, that, at the time these classifications went into effect, the non-flying "dead wood" of the Air Reserve was wisely weeded out of the active duty list so that, in spite of a pared-down budget, those officers who still actually could and would fly, might be given the opportunity of brushing up their art with two weeks' active duty each year.

The theory behind this was sound and the change did wonders in boosting the morale of the Reserve. With the promise of being given fast "service type" planes, there was a real incentive to qualify as "Class One" pilots; and many of the more practiced Air Reserve officers did so. The others, their ranks reduced by those who had been graduated into the higher division and their opportunities no longer cut down by non-flying Reservists sharing their time in the air, got a chance for more practice with "training types" and in turn were better contented. More men

By C. B. Allen

came down to Mitchel Field for practice flights, when the active duty training was over for the summer, in order to

preserve the status for which they had striven and in order to continue to be eligible for flying in that grade. The regulations were specific: a Reserve officer who was qualified on either "service" or "training" type planes was eligible to continue flying the machines on which he had qualified without further "check rides" from the regular personnel of the field, or other red tape, providing not more than a month had elapsed since his last solo in this type.

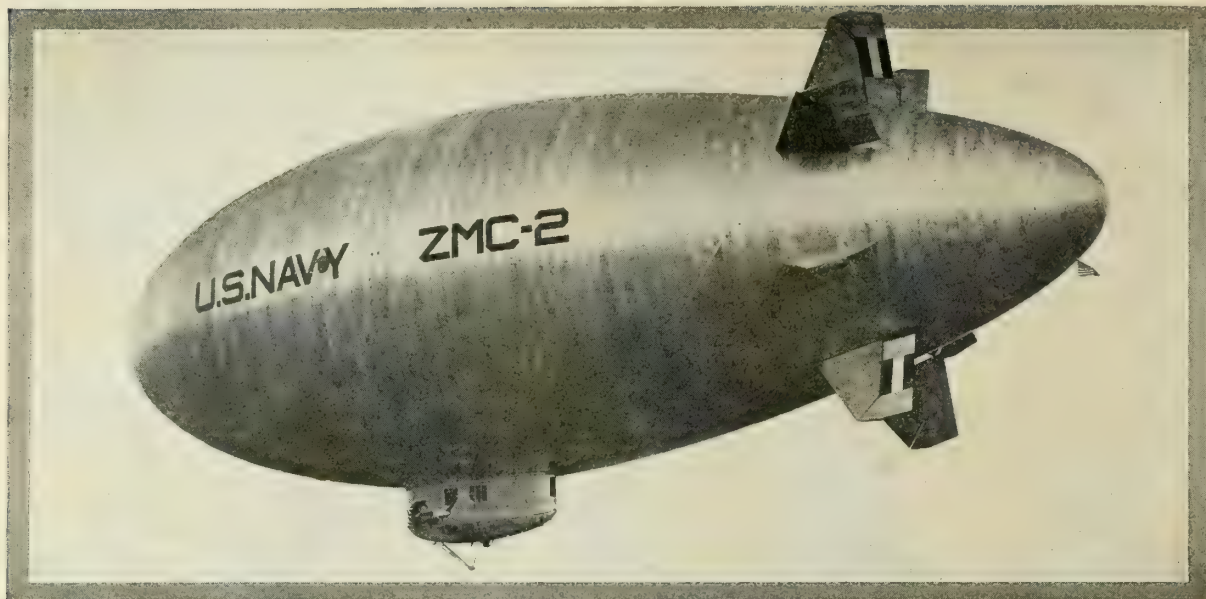
But it was not long before this ointment developed its fly. Reserve officers, listed as "Class One" pilots, found again and again on reporting to Mitchel Field for practice flights that there were "no service types available." Curtiss Falcons in profusion might be standing idle on the line, but for one reason or another, they were "not available" and the Reservists found themselves shunted into lumbering old PT's, with the chances of maintaining their "Class One" ratings gone glimmering. Frequently, the officers in command of the First, Fifth and 99th Observation Squadrons (whose duty it was to supply planes in turn for Reserve flying) were able and willing to supply "service types" but were prevented from doing so, or called on the carpet if they did, by the Post Operations Office. On one occasion Capt. Walter Bender, who is Operations Officer of the field despite the fact that he holds only an observer's rating, issued an arbitrary order to the squadron commanders under him that "no more service type planes will be available to Reserve officers." This situation, however, was promptly called to the attention of Governor's Island and as promptly remedied by the order's withdrawal.

Yet the reluctance of those in charge at the field to let Reserve officers fly "service type" planes continued and has manifested itself in many ways. Everyone knows that men who fly only occasionally are less sure of themselves in the air and therefore potentially greater hazards than those who are in constant daily practice. It would seem sensible, therefore, to provide such men with equipment that is the least likely to give trouble—if not for their own safety, then for the sake of the more or less valuable airplane with which they happen to be intrusted for the moment. Specifically, they ought to have a dependable modern engine rather than a war-time power plant with a flair for cutting out at the very minute when it is needed most. But no—Reserves invariably (when they are given "service types" at all on inactive duty) are assigned to fly Liberty-powered Falcons while those with D-12 engines are jealously kept for the uses of the regular personnel. There may be a sound and constructive policy behind this practice; but in the minds of the Reserves, whether they encourage it or not, there lurks always the suspicion that this equipment is "wished off" on them for the very reason that it is likely to figure in a crash.

Another instance of inefficient thought and action in training the Reserves cropped up this year at the summer camps. Among those called to active duty were both "Class One" and Class Two" pilots, the latter in the majority. Most of the former were qualified on "service types" up to and including their last previous practice flight in June. By any ordinary process of logic they would have seemed eligible with a minimum of supervision to continue flying planes

(Continued on page 294)





*The first successful all-metal dirigible in the world, the Navy ZMC-2, built at Grosse Ile, Mich., by the Detroit Aircraft Corporation*

## THE ALL-METAL DIRIGIBLE ZMC-2

**M**ANY columns of newspaper space during the past few weeks, have been devoted to the United States Navy's airship, ZMC-2, and its unique engineering features. Naturally in such a mass of printed matter there is a great deal of accurate information about the all-metal dirigible and its performance, but there is also some fiction.

In order to present a true picture of the ship itself, it is necessary to consider briefly something of its history, and at the same time to bear in mind that the ZMC-2, which was flown from Detroit to Lakehurst in September, is purely an experimental airship. In the spirit of fairness to the aeronautical industry, to the United States Government, which contracted for its construction, and to the general public, I am taking this opportunity to emphasize that fact.

Shortly after the close of the war, a group of well-known business men decided that, in spite of depression then existing in the young and struggling industry, aviation had before it a brilliant future. Consequently, in 1921 they began to lay plans for a time when the public should become more air-minded, and the world would turn to aviation as an accepted means of travel. Under the leadership of Harold H. Emmons, who was in charge of airplane engine production for the United States Government during the World War, a group of

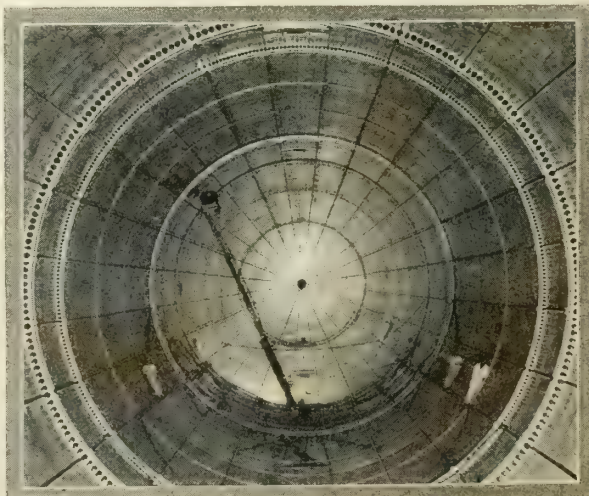
*By Edward S. Evans*  
*President, Detroit Aircraft Corporation*

engineers and industrialists prominent in the automobile industry formed the company which eventually developed into the Detroit Aircraft Corporation. Among the more prominent men associated with the original venture were Charles F. Kettering, William B. Mayo, R. E. Olds, Alex Dow, Ralph H. Upson, and a number of others, including Carl B. Fritsche, who later became general manager.

This company built a factory on Grosse Ile, Michigan, and set about to study, by means of practical experimentation, the application of the all-metal idea to aircraft. About the same time, a number of others were experimenting with all-metal airplanes, but the Detroit engineers adopted what afterward proved to be a fortunate line of experiment.

Instead of proceeding with heavier-than-air work, they decided to build, if possible, an all-metal dirigible, believing that such a ship would be a great step toward the solution of the problem of long distance flights, and that the same metal working principles required to build such a ship could readily be applied to the construction of airplanes.

After many months of experimental and engineering research, it was decided that the first all-metal dirigible should be of 200,000 cubic foot gas capacity—which is comparatively small for a rigid airship. This particular size was selected because its actual



*Inside view of the hull of the ZMC-2, showing structural members*



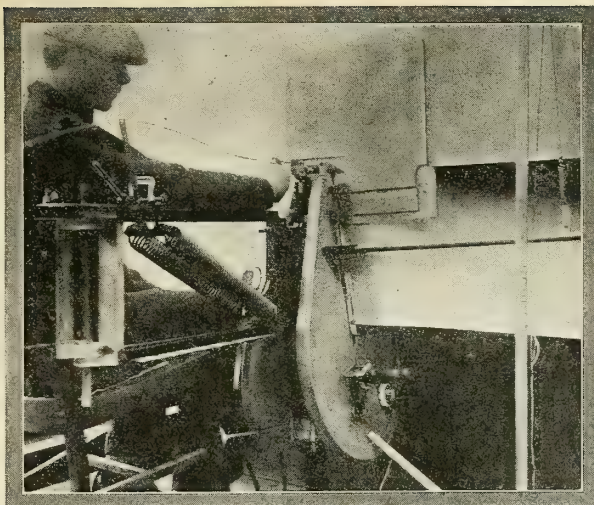
cost in time, labor, and material is not appreciably larger than that of a smaller ship, and because a ship of less than 200,000 cubic feet was deemed too small for the purposes of demonstrating the three aeronautical innovations which are incorporated in the ZMC-2.

The all-metal dirigible is a radical departure from any existing airship in that it is made entirely of metal and that its shape and its method of control are distinctly new. The ZMC-2 is 149 feet 5 inches long and 52 feet 8 inches thick at its maximum diameter, which gives it a ratio of fineness of 2:8. The relatively short, thick egg-shape hull quickly proved its ability on the trial flights, but a large measure of its success has been the result of the unique method of control developed by the Detroit Aircraft Corporation's engineers.

Instead of the conventional rudders and elevators located at the tip of the stern, which are so familiar on both dirigibles and blimps, the ZMC-2 is controlled by a series of eight fins, projecting from the circumference of the hull at regular intervals. These fins are about thirty feet forward from the stern of the ship. The pair on the top and bottom are synchronized to act as rudders; similarly, the pairs on each side serve the purpose of elevators. The control surfaces, totaling 440 square feet, are controlled by cables passing through metal tubing welded to the hull.

Trial flights of the ZMC-2 have thus far proved the theories advanced by the designers of the ship. Formerly it was thought that an airship had to be long and slim in order to pass smoothly through the air and have proper stability. The entire theory of Zeppelin design is based on that thought, but in more recent years the tendencies have been toward shorter and thicker Zeppelins.

It was found that the ZMC-2 control surfaces, situated as they are to the rear of the greatest diameter of the hull, act on the smooth flow of air that sweeps along the hull during the flight. This fin arrangement is about 17 per cent less in area than those of the definite Zeppelin type ships, using volume as the basis of comparison, and provides more effective control. They afford the pilot an extremely sensitive method of control which enables him to maneuver the ZMC-2 more like an

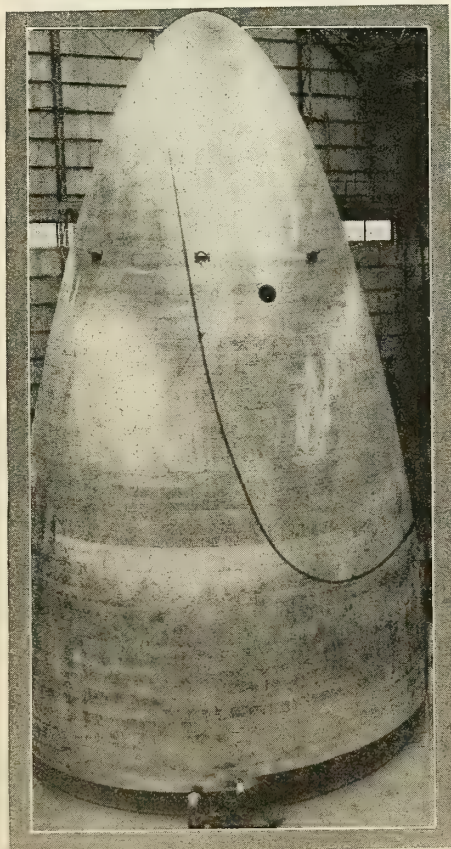


The Hill riveting machine which automatically spaces, inserts and heads a triple row of rivets fastening the hull plating

necessarily required for workmen to climb up and down the frame work of the ship and to hoist materials and tools. It was decided therefore, to build the hull in two upright halves which would be gradually raised from the floor of the factory, as the work progressed, thus enabling workmen to remain on the hangar floor during the entire period of construction. The construction began with the nose and the stern pointing upward from the floor of the hangar, and when the halves were completed, they were turned horizontally and riveted.

By means of a remarkable piece of automatic machinery, the invention of Edward J. Hill, the hull plating was riveted in place. The long strips of Alclad, of .009 average gauge cut in the proper curvature to conform to the shape of the hull, were unrolled from a spool on the riveting machine and fastened in place with the triple row of rivets. This automatic riveting machine was mounted on wheels running on rails laid in concentric circles under each half of the hull.

The Hill riveting machine automatically spaces, inserts and heads a triple row of rivets at a rate of about five thousand per hour and at a cost which compares favorably with that of completing the same amount of stitching of fabric seam. This riveting machine is one of the most ingenious and valuable methods of metal working that has yet been devised in the aeronautical industry, using .035 gauge wire which is fed into the machine in three strands. It cuts the wire, pushes it through two sheets of metal and heads up a triple row of rivets with such speed that two men, in one hour, can (Continued on page 261)



Position of the stern half of the hull as it appeared while being constructed at Grosse Ile



# INTERNATIONAL LIGHT PLANE CONTEST

THE recent *Challenge International de Tourisme*, or Contest for Light Aero-

By Paul E. Lamarche, Jr.

AERO DIGEST Correspondent in France

planes, which started at the Orly Field, near Paris, on August 3rd, brought together a total of fifty-five light touring planes representing many of the principal constructors in Europe. The results of this contest were of great interest in demonstrating the merits and general airworthiness of different types. Much also has been learned from study of the causes of the elimination of those which failed.

The meeting was divided into two parts, the first of which took place at Orly from August 4th to 7th, during which time the planes were put through a series of qualifying tests to prove their airworthiness and general aerodynamical qualities. The second part was the Tour of Europe which started from Orly on August 7th and ended at the same field on August 14th. This contest was won on a point basis and was not a race, though the speed of the winner counted for 70 points, the largest individual point score possible. Since the greatest value in air transport is speed, this quality was given the greatest scoring. The point system covering both the qualifying tests and the tour was as follows: 40 points for practical qualities; 20 points for low fuel consumption; 35 points for regularity; 70 points for speed.

The greatest total which could be scored for both parts is 165. These scoring events, especially the first one, were in turn divided into various individual tallies making the totals. Of the fifty-five planes entered, eight were eliminated in the tests at Orly. At this field a number of tests were made for practical qualities and low fuel consumption. In the first test for ruggedness of construction and comfort of the crew, the two Potez 36 cabin monoplanes were awarded the highest score; the new Junkers Junior, the Italian Breda, a cabin monoplane, the French Guerdais-Henriot cabin monoplane and the Coupé Moth also figured in the scoring. The next qualifying test was for the best dual control arrangement, in which the Fiat monoplane scored the highest. Six of the participants were not equipped with dual control. The Darmstadt, the Klemm, the Junkers Junior (all German planes), the Italian Breda and the Czechoslovakian Avia received scoring tallies for

the best provision for the use of parachutes.

For the best protection against fire, the all-metal Junkers Junior scored highest. The Caudron, Guerdais-Henriot of France, the Breda, Romeo and Fiat of Italy, and the St. Hubert of Belgium shared in the distribution of points. In folding-wing tests the two Gipsy Moths of Captain Broad and Miss Spooner, which were entered through the Aéro Club de France and incidentally the only planes of British construction, scored highest by folding and opening the wings in 22 and 30 seconds, respectively. The Potez, the Aero, and the Breda also won points for this test; thirteen of the participants were not fitted with folding wings. In the starting test the Klemm planes were the highest scorers.

In the fuel consumption test, which was of importance since it was eliminatory, the Swiss flier Wirth in a Klemm with a Salmson motor won, over a closed circuit of 324 kilometres. In winning this test the Salmson motor on Wirth's Klemm consumed 20.176 kgs. of fuel while maintaining an average of speed of 109.533 kms. per hour. In this part of the test, a German B.F.W. plane was eliminated for excessive consumption, another B.F.W. from engine trouble, and a third failed to qualify. Two Potez planes were eliminated for landing during the test; a Yugoslavian Ikarus biplane, for not having a suitable propeller; and a Focke-Wulf and an Arado were also among the eliminated.

In the speed test over this circuit Lord Carberry in a German Raab-Katzenstein (R-K 25) with an English Cirrus engine scored first with a speed of 174 kms. an hour consuming 47 kgs. of fuel. Second and third places went to an Italian Romeo and another Raab-Katzenstein, respectively. In these preliminary qualifying events at Orly Field a total of 46 points was possible. The highest scorers were a Klemm-Salmson, a Czechoslovakian Avia with a Walter engine, and the Darmstadt with a Genet engine, all of which were awarded 32.5 points. The next seven places went to German Junkers and Klemm planes. The qualifying planes were divided into two general categories, being classed as to weight, the first being for planes weighing up to 280 kgs. empty and the second group being the heavier light planes whose weight does not exceed 400



Orly Field at the finish of the Tour of Europe, when sixteen out of forty-six starters finished on schedule

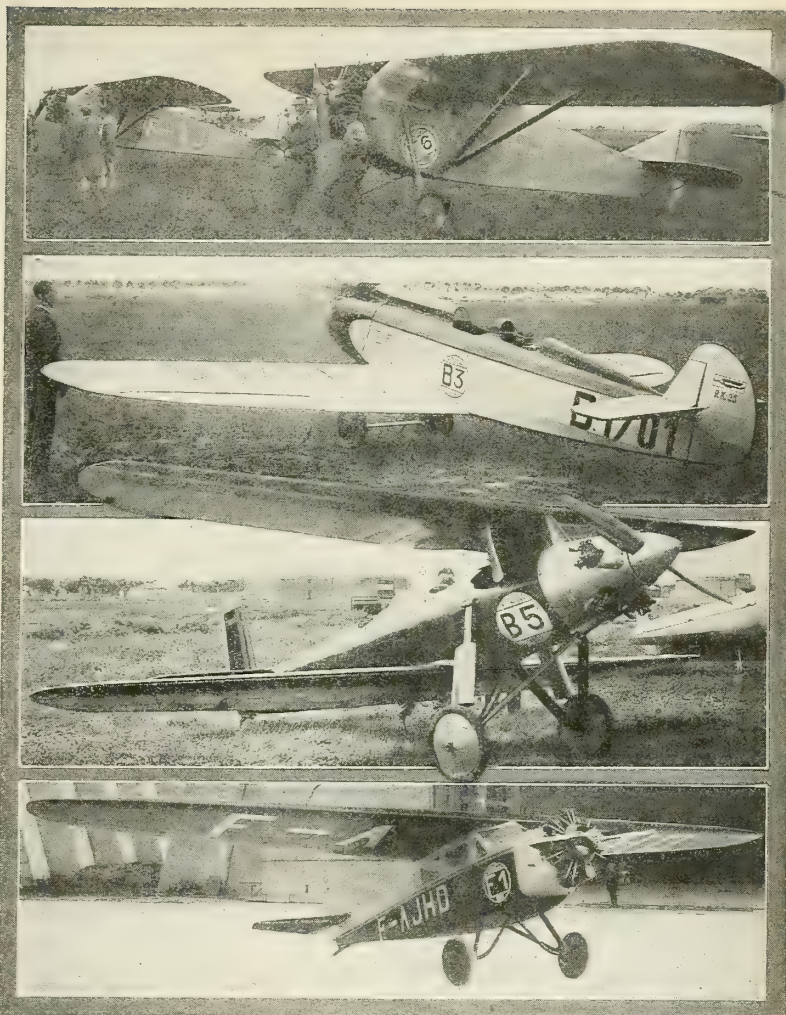


kgs. empty. The power output of the engine of every plane was less than 100-horsepower.

On August 7th the Tour of Europe started with 47 entries, one of which was eliminated at the outset when the landing gear collapsed, while a Belgian St. Hubert was forced to drop out after starting because of magneto trouble. The planes were supposed to fly to St. Raphael on the first day by way of Basle, Geneva, Lyons and Marseilles. Because the weather was bad on that day, only seven reached St. Raphael, eleven having stopped at Marseilles and fifteen at Lyons. During the first day of the tour an Italian Breda parted company with its landing gear in taking off at Lyons; the Checkoslovakian flier, Vleek, was eliminated by a forced landing that damaged his plane; a Klemm suffered from a forced landing in the south of France, and a further reduction in the number of competitors was made when an Italian Cant. 26 was forced out at Basle.

On the second day the destination was Belgrade with stops at Turin, Milan, Venice and Zagreb. The first to arrive there were Captain Broad and Miss Spooner in Moths, Delmotte in a Caudron and Mazotti in a Breda. During this stage of the tour, the German flier Altemeier was forced to land his Klemm near Venice because of fuel stoppage. Nehring was forced down at Zagreb from the same trouble but was able to carry on later. The third day brought the leading planes from Belgrade to Turin-Severin and Bucharest, the farthest point east in the tour. The leaders at this point of the competition were Delmotte with a Caudron, Roederer in a Junkers, Offerman in a B.F.W., Carberry in his R-K 25, Kirsch in a Klemm, Nehring in his Darmstadt, Kleps in his Avia and Miss Spooner and Captain Broad in their Moths. On the fourth day of the tour, some of the trailing planes managed to catch up a bit. The leaders flew on to Prague, stopping at Budapest, Vienna and Brno. Lord Carberry in his speedy little R-K 25 was the first arrival at Vienna where very bad weather had set in. With one exception, however, all of the leaders flew through it to Prague and the position of the leaders remained the same. On the fifth day, the route was from Prague to Hamburg with stops at Breslau, Warsaw, Posen and Berlin. While over Poland Nehring in his Darmstadt was forced to land because of difficulties with his motor, and his plane was too badly damaged to continue.

Up to this point out of 46 planes that actually started from Orly, 42 arrived at Basle, 41 at Geneva, 40 at Lyons, 39 at Marseilles, 38 at St. Raphael, 37 at Turin, 35 at Venice, 32 at Zagreb, 30 at Belgrade, 25 at Bucharest, 21 at Budapest, 16 at Vienna, and 14 at Breslau. On the sixth day, those who were in Hamburg continued on to Amsterdam. Because of the fact that the remaining contestants were not supposed to arrive at the finishing point,



Entries in the light plane contest: reading down, two Potez 36 cabin monoplanes with Salmson engines; Lord Carberry in his Cirrus-powered R.K.25 monoplane; Nehring's Darmstadt biplane with a Genet engine; a three-passenger Guerchais-Henriot cabin monoplane

the Orly Field, before the 14th of August, the fliers were forced to remain at Amsterdam for a day before continuing on to Brussels and finally to the Orly Field on the day following. This enabled many of the stragglers to catch up a bit. On the last stage of the tour sixteen planes managed to arrive at Orly on scheduled time while others trailed in during the ensuing few days. Of the sixteen planes that finished on schedule, nine were German, two were Italian, two were French, two were English planes entered by the Aéro Club de France and one was Checkoslovakian. The German planes that showed up so well in this tour were Klemm-Salmsons, of which there were four at the finish; Junkers and B.F.W. planes also performed well.

In the final results including the preliminary events at Orly and the Tour of Europe, the first place was awarded to Herr Morzik, who won a total of 138.5 points out of a possible 165. These points were scored by his speed, his regularity and the practical qualities of his plane, though in this last named qualification he scored only 19.5 out of a possible 46. The plane used by Herr Morzik was a B.F.W. low-wing monoplane equipped with a 70 horsepower Siemens-Halske air-cooled engine. The second

(Continued on page 256)



# FLYING BOAT DESIGN

By Dr. I. A. K. Rohrbach

**T**HE problems encountered in the design of flying boats are in respects rather different from those pertaining to the design of land machines. In order to be better understood, I shall take the better-known qualities of landplanes as a basis of comparison in bringing out the various flying boats problems.

Whereas land machines operate from more or less similar solid fields, flying boats have to contend with a water surface, the condition of which depends very much on the weather and on the place. The reaction between boat and water, in turn, depends very much on the shape of the boat.

In analyzing the design of a flying boat, there are five main problems: The size of the boat, the aerodynamic qualities, the floating system, the structural principles, and the general arrangement, which combines the best solutions for the first four problems.

As far as the ground operation of landplanes is concerned, there is practically no advantage in a bigger machine over a small one, whereas the bigger flying boat, like bigger surface vessels, is much more stable in rough seas. In flight a big commercial flying boat of 20,000 pounds, or more, is considerably more economical than a landplane of equal weight.

It is an established fact that the weight of the flying structure of large machines is in greater portion to the gross weight than of small ones. This is particularly true if heavy planes are built with relatively large wings which have small wing loadings, because much weight or aerodynamical resistance is required to build these widely stretched out wings and corresponding fuselage and tail-plane structures.

Because of the restricted size of landing fields and the high ceiling needed to fly over the mountains, the big landplane has to have relatively small wing loadings and low landing speed. The result is that for commercial landplanes the greatest efficiency seems to be reached with a size of about 10 to 12 tons. Beyond this size, the increased weight of the structure becomes more and more pronounced, and counteracts the pay load carrying capacity.

In the case of the flying boat, however, the effect of increased

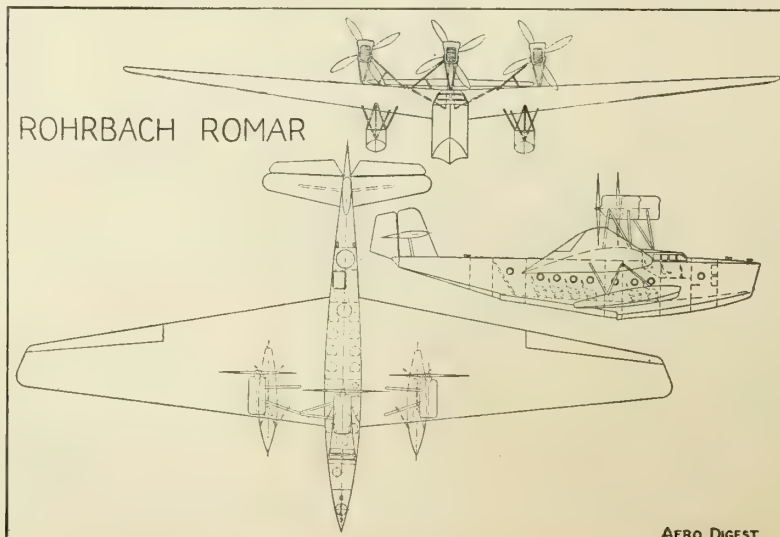
size is less pronounced. Many authorities admit today that the landing speed of large flying boats can be increased within reason over that which is good practice in small seaplanes. The explanation is that a certain wave representing a certain weight of water has less effect on a large heavy boat than on a small, light seaplane. This increase of the landing speed is about 20 per cent to 25 per cent in a big flying boat, and means a relatively smaller span, smaller length of tail, and smaller area of tailplanes. This more concentrated flying structure is so much lighter than that of a landplane of the same gross weight would have to be, that the most economical size for commercial flying boats today is a gross weight of about 20 to 25 tons, more than twice that of the most economical landplane. The *Inflexible*, a giant bomber which we designed for the British Air Ministry, has about the same wing area as the Romar flying boat, although the

weight of the *Inflexible* is 15 tons as against the Romar's weight of 19.5 tons. The span of the *Inflexible* is 150 feet and that of the Romar but 120 feet. In accordance with these mechanical laws and weight proportions, the heaviest landplanes in existence have a gross weight of about 15 tons, whereas the heaviest flying boat, the Dornier Do. X., has flown with a weight of 48 tons, which was taken off after a run of 160 seconds. Though the Do. X. has not yet passed its development period, its weight empty of about 35 tons, with equipment, is 73 per cent of the 48 tons, whereas the Romar, with a gross weight of 19.5 tons, including equipment, has a weight empty of 11.2 tons or 57.5 per cent of the gross weight. These figures prove that the Do. X. has probably already passed the most economical size from a weight standpoint.

As far as the cost of construction is concerned, it is hard to say how it will influence the most economical size. The greater number of machines that can be sold in smaller sizes reduces their cost, whereas the building cost of a big machine compared to its carrying capacity is relatively smaller for the same reasons which in other fields reduce the cost of one big unit against that of a combination of small units of equal total power. The heavier wing loading of a



Dr. Rohrbach, designer of flying boats



AERO DIGEST

big flying boat reduces somewhat its speed of climb, but a high ceiling is not needed; and even a heavily loaded 4-motored flying boat has enough margin of power to fly for any length of time with one motor dead.

In regard to the emergencies of forced landings, a big landplane is usually much worse than a smaller one, which can make forced landings relatively easily, and if it should not be able to take off again without much trouble, can be transported to some flying field. The opposite is true of flying boats. In most cases a flying boat which has made a forced landing cannot count on outside help as quickly as a landplane. For this reason it is very important that the flying boat be self-contained, and it is obvious that the larger machine with its greater seaworthiness, with its spacious rooms and more numerous crew, certainly offers a great advantage over a small machine with a crew of two. It is understood that if the technically best size of flying boat today is 22 to 25 tons, it will steadily be increased by every improvement that is contributed to the art.

With our experience of today, the Romar powered by four Hornet engines, and weighing 19.5 tons, will carry up to 45 passengers over a distance of a few hundred miles, and several thousand pounds of pay load over a distance of 2,000 miles, allowing a 25 per cent distance reserve for Cape Verde-Fernando Noronha, the longest leg of the Europe-South America route. I believe that within two or three years we shall be able to carry a pay load of several thousand pounds over a distance of 3,000 miles allowing the necessary 50 per cent distance reserve for the flight between the Azores and Bermuda, where strong headwinds are encountered over the greater part of the way.

The monoplane type of flying boat, especially in large sizes, is preferable because of greater speed and greater simplicity. The aspect ratio of monoplane flying boat wings varies in different types from 1:5 to 1:10. The wings of some types of flying boats are rectangular.

Tapered wings, though more costly to build, have the advantage of lighter weight and smaller rolling moments in a sidewind while the machine is floating on the water. The double tapered wing has a greater ratio of thickness to chord at the root than at the tip, and has less weight, and sometimes smaller air resistance, through the thinning out of the wing profiles near the tip. It is important that the wing profiles be so designed that there is a minimum variation of aerodynamic moment or, as some put it, a minimum movement of center of pressure for various angles of incidence. Obviously the smaller this variation of aerodynamic moment the smaller are the counter moments that are to be provided by the tailplanes. This in turn means smaller tail surfaces and a shorter tail for a certain



The Rohrbach Roland, a three-engined landplane for transport service

controllability at a certain speed.

In order to be safe at stalled landings in heavy seas, flying boats should have very good controllability at lowest speeds. The moments that can be exercised with full elevator or full rudder must be considerably greater than those needed to counteract the aerodynamic moments of the wing and than those needed for landplanes. The smaller the aerodynamic moment of the wing, therefore, the greater the controllability that can be obtained with a certain area of tailplanes and length of tail, and correspondingly with a certain weight expended to build these parts.

We have found it necessary to balance all control surfaces of big boats. The most satisfactory method up to the present has been to place the axle about 15 to 22 per cent of the chord length behind the leading edge. Rather large vertical fins are necessary in order to provide longitudinal stability in spite of the great portion of the boat that is in front of the wing. A dihedral angle of from four to five degrees is important in order to have good lateral stability at stalling speed. If all the before-mentioned aerodynamic conditions are fulfilled, the flying qualities of a big flying boat are as perfect as those of the best training planes. The *Romar*, for instance, is stable in all three directions. Curves up to a bank of 70 degrees can be flown with the rudder alone. The machine recovers from a sideslip if controls are not touched; and it has been reported that, during recent flights of 12 and 17 hours duration, controls remained practically untouched during the entire time.

The floating system has to fulfill the following conditions: (1) flotation at rest must be longitudinally and laterally stable under all possible conditions of wind and load. (2) at moderate speeds on the water the flying boat must be as nearly perfect a surface vessel as possible—there must be good controllability; (3) not too much spray must be thrown up in a rough sea with a strong side wind; (4) at high speeds close to take-off speed, the running must be free from pounding; (5) at all speeds the resistance should be the minimum possibly attainable.

A flying boat with a hull sufficiently long to support the tailplanes has automatically enough longitudinal floating stability. In order to obtain lateral stability, we have found it best to have two side floats of substantial size, not too far away from the hull and well immersed at rest.

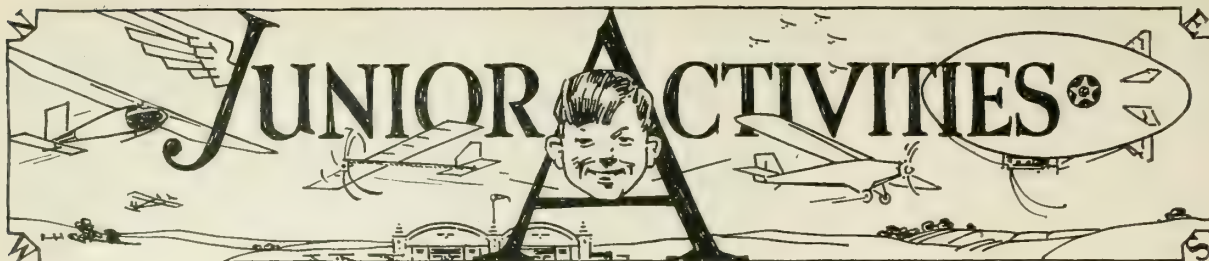
The lateral stability of this arrangement is such that a side wind of 30 miles per hour will not force the leeward wing into the water. Flying boats of this type have been on the water for many hours in gales up to 55 miles per hour without any special precaution. It is believed that the boats always will be able to ride out gales of similar force, floating behind a drift anchor. The high bow, which cannot cut under waves, is

(Continued on page 274)



The largest flying boat thus far built by Rohrbach, the trimotored Romar





## WE BECOME "GLIDER MINDED"

**R**EADERS of "Junior Activities" will be interested to learn about the wonderful glider work at the Cleveland Air Races. We can't at this time present drawings of the different types, but you know the average American experimenter has so much originality about him that all he wants is general information. He wants to know which types are most successful, how they can be flown, what kind of a landing gear is best and which wing curves are most popular; after which he does his own planning.

So there I stood at the main gate of Cleveland's great airport, armed with camera and passes, trying to get through to the far corner of the field where the glider contests were scheduled to be run off. The guard failed utterly to appreciate the importance of my mission (airport guards have that failing, you know). Consequently, I tried appealing directly to Cliff Henderson, Managing Director of the Races. "No, I'm sorry," said Cliff, "we have plenty of glider pictures at the studio back in town. No admission to the field without this or that, arm band, etc." Cliff sure had his

### CLEVELAND AIR RACES DISCLOSE GREAT INTEREST IN POPULAR SPORT

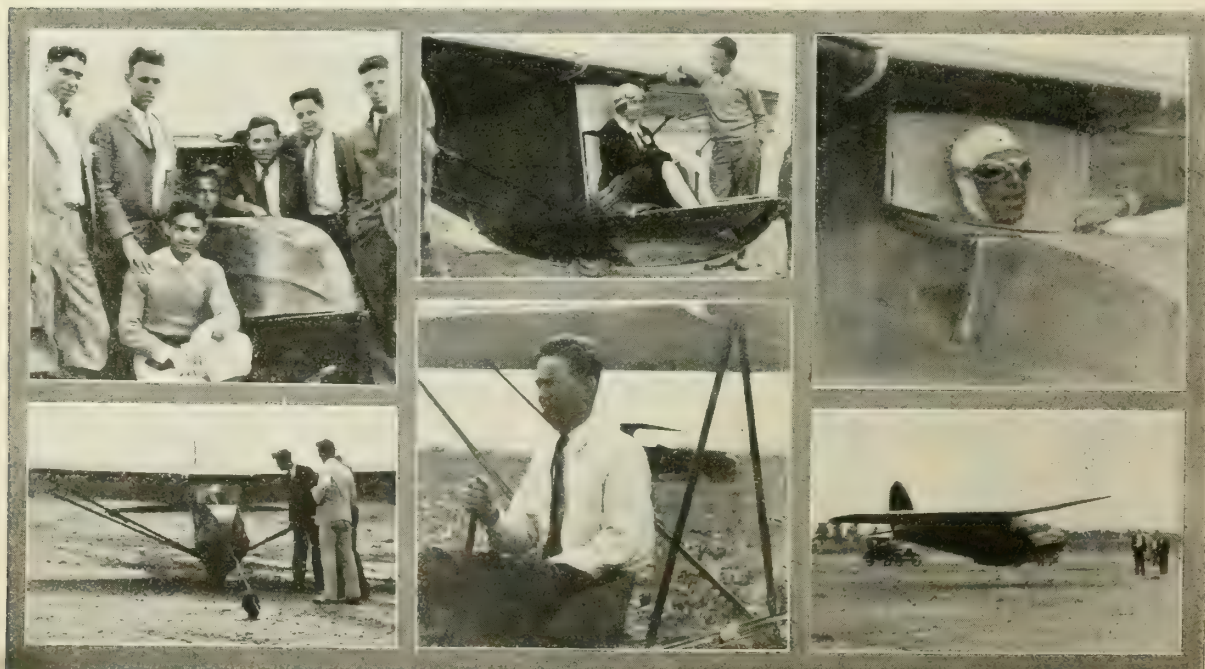
By R. E. Dowd

hands full on such occasions. Everybody had his own reasons why he should be right out in the center of the airport; but anyway, five minutes later as I hung on to entry number 13, which was being slowly towed across the field to the starting place, Cliff was still battling with self-styled distinguished personages, most of whom were soon extinguished.

Can you picture those gliders there on the field? Long winged sleek-looking soars, as trim as albatrosses; wide-winged trainers lazily cocked over on wing tips, here and there. There's one with a steel tube fuselage and a split axle two wheeled landing gear, and another with a single squashy balloon tire. And still farther over is a large one. It towers over all the others. Number seven, it proves to be. The workmanship appears a little rough, but she has

flown already. Some Cleveland High School boys have built it up from photographs of other gliders. And here are evidences of our Universities' interest in the great sport. The University of Detroit has a beautiful primary type with rigid boom outriggers supporting the tail, and Prof. Franklin of the University of Michigan has two beautiful machines, one a secondary type and the other an advanced soaring type, which was towed in from Ann Arbor behind a Moth plane.

"Wally" Franklin guided the product of his brother's genius with skilled hand, and after tripping the towing cable at 3,500 feet, came in to a beautiful landing, right in the midst of the glider assembly. It was a beautiful plane, beautifully designed, beautifully made, and there was a touch of the uncanny in its arrival. Like a great bird it wheeled and spiraled, taking over five minutes to make the descent. It glistened in the afternoon sunlight, and as it straightened out for its last swoop, its pilot shouted, "I'm coming in. Give me a little room ahead there, will you?" And he did come in—a beautiful one point landing on the



Personalities at the Cleveland Glider Contests. Top: R. E. Dowd (left) and a group of enthusiasts from University of Michigan. Top (center)—Lady Heath. Top (right)—Frank Hawks. Bottom: Hawks ready to start. (center)—Jack Foster. (right)—Lady Heath taking off.



mono-wheel gear—not fast either, perhaps twenty-five miles an hour. Wally said little as he stepped out toggled in a blue business suit with an inside sweater. He seemed a bit cold and perhaps stiff from the cramped quarters. His helmet and goggles were removed and he busied himself directing the moving of the glider back to the mooring line.

"America is not only air-minded," I said, "America is glider-minded as well." Great things are in store when the youth of this country take up the sport with the enthusiasm of the Franklin brothers.

But let's turn to some features of construction. Wide deviations are already apparent, and American ingenuity is finding expression even in these early days.

#### THE PRIMARY TYPE.

Built after the precedent set by the German glider designers, who have generally been recognized as the masters of this art, a type of glider known as the primary is much in evidence. It is a monoplane with a high wing position, usually flat,—that is, without dihedral. The operator sits at the leading edge of the wing supported on an open fuselage framework, sometimes of steel, but usually of wood. This fuselage extends back to support the tail unit or empennage. Some sort of a landing gear is provided, either a single wood skid, a single wheel or a regular two-wheeled gear of more or less conventional design. The controls are standard "stick" controls, and a trip mechanism is provided to drop the tow line.

Usually the span of such machines is between thirty and thirty-five feet. The

weight empty averages about 200 pounds, and the wing loading, just about two pounds per square foot. This would mean a total weight of 360 pounds, allowing one hundred sixty for the pilot, and at two pounds per square foot, a wing area of 180 square feet. Now, for that area we can use a span of thirty-six feet, and a chord of five feet. Popular wing sections are Goettingen No. 387, and No. 435, although Clark Y and N.A.C.A. 12 sections have been used. Usually a fixed vertical fin is carried above the main plane to assist in rudder control, since this type has little lateral area forward.

An overall length of about two-thirds of the span is quite common, and all control surfaces are usually large in order to function efficiently at slow speeds. Take-offs in calm weather seem to require a run of only fifty or seventy-five feet, and speeds only a little faster than running speed. Landings are gentle and require practically no run after contacting with the ground.

Frequently the fuselage takes the form of a single truss braced laterally by guys running from wing to fin, and from stabilizer to fuselage. A more rugged construction is to be found in the Akron glider, in which the outrigger booms diverge from the rear of the skid and the rear spar of the wings to the outer edge of the stabilizer, eliminating all wire bracing.

#### THE SECONDARY TYPE.

Professor Franklin's secondary type attracted much attention. Lady Heath, Miss Earhart, and Captain Hawks, all flew it with great ease. It is an enclosed fuselage, semi-cantilever wing type, weighing 230

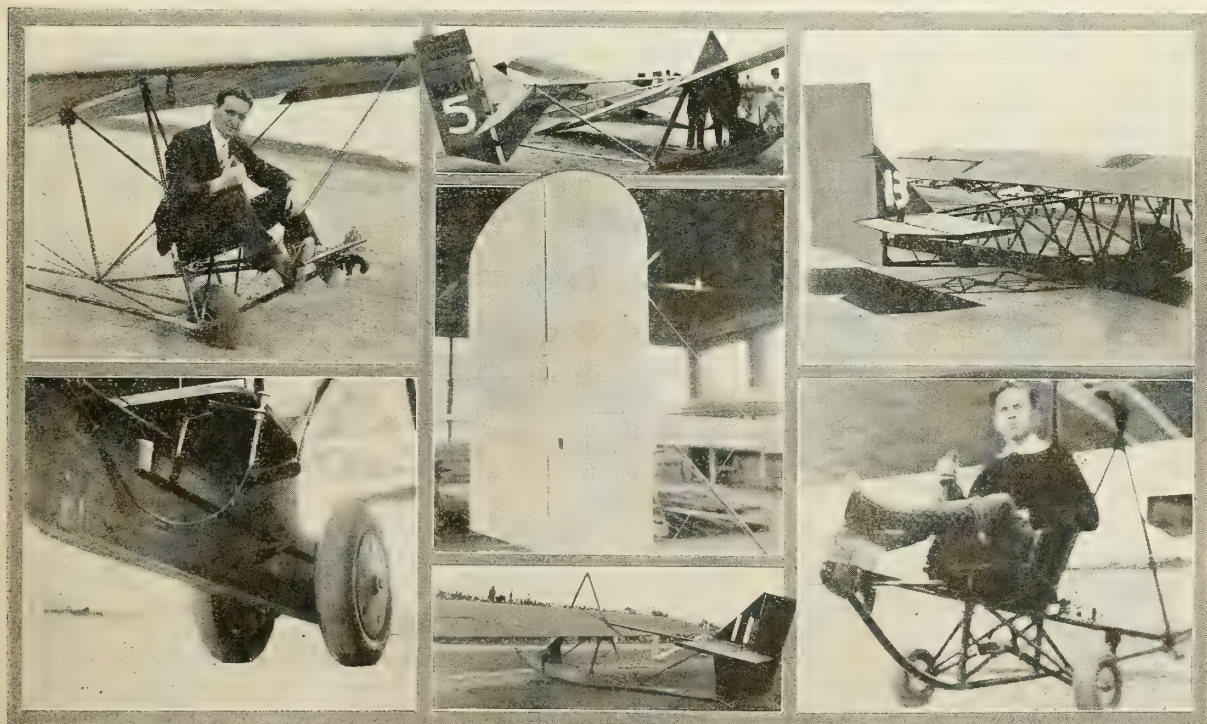
pounds, empty. Its span is 40 feet, and the wing area totals 200 square feet. The wing section is a combination of M-15 and M-12, nicely tapered in plan and thickness from root to tip. Allowing 160 pounds for the pilot, loading amounts to 1.95 pounds per square foot. The fuselage is of welded steel tubing, fabric covered. A single 10 by 3-inch wheel is fitted at a point about under the center of gravity and a wood skid runs both fore and aft of the wheel. A brake, acting on the tire surface is operated by a control cable located near the pilot's seat.

The wing is of wood having two plywood box spars and is fabric covered. The leading edge is completely covered with plywood, which is more or less standard glider and plane practice.

Another secondary type machine arrived one afternoon, having been towed in from Pontiac, Michigan. Captain Hawks piloted the craft to a beautiful landing directly in front of the grandstands. The plain, a parasol type, bore markings indicating the flight was sponsored by the *Detroit News*. This machine was of a type more common in Germany, since the wing was elevated above the fuselage, which was plywood covered.

#### THE ADVANCED OR SOARING TYPE.

Only one glider of this type found its way to the races, and that was the forty-six-foot span glider flown in from Ann Arbor. Since the general construction was the same as the Franklin secondary type, repetition will not be necessary. In general, the soaring types are more perfectly streamlined and the aspect ratios of the planes are higher. Wing loadings reach as



Details of glider construction. Top (left)—E. K. Doe in glider with single balloon tired wheel. (center)—Akron Club glider. (right)—Fitzsimmons and Robinson's glider. Bottom (left)—Close view of "Orion" glider. (center)—Alfaro, and above it a view of the tail works of the Cook "Yankee Doodle, Jr." (right)—A novel split axle landing gear.



high as two and one-half ( $2\frac{1}{2}$ ) pounds per square foot. The *Professor*, an imported German sailplane which has been soaring at Corn Hill, Cape Cod, has a wing loading of approximately two and four-tenths ( $2\frac{4}{10}$ ) pounds per square foot; whereas the trim *Darmstadt*, being finished at Akron under the supervision of Dr. Wolfgang Klemperer and its German designer, Dr. Gross, carries a wing loading of two and one-half ( $2\frac{1}{2}$ ) pounds per square foot.

Much secrecy surrounds the choice of wing section on soaring planes, and in Germany the curves actually used are frequently the result of careful combining of good qualities of curves previously used in full-sized machines. The wind tunnel results apparently do not suffice in such cases. The refinement being too precise.

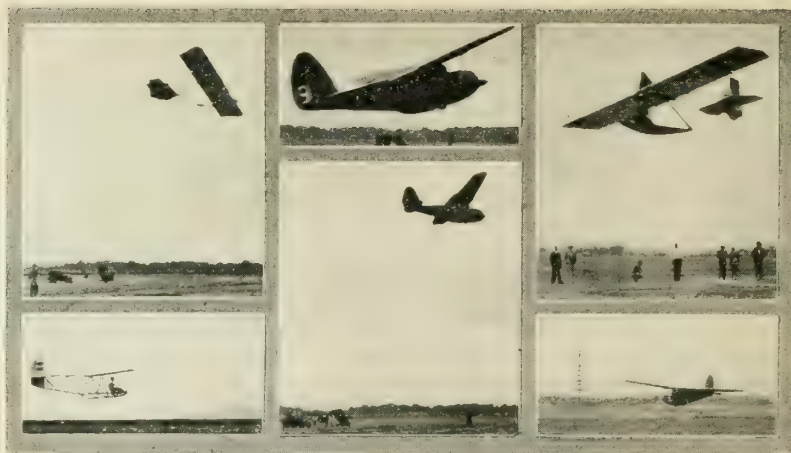
#### Methods of Flight

Many have regarded glider flying as a sport requiring special terrain, special wind conditions, and special training. It is true that actual soaring will probably be restricted to a few locations adapted to this sort of activity because of geographical conditions, but it is also true that any flat field—any airport, cow pasture or golf course, which will permit a car to be driven against prevailing winds at speeds as high as thirty-five or forty miles an hour, is a potential glider airport. The Cleveland races proved that.

Altitudes of several hundred feet were acquired quickly; releasing of the towing cable was accomplished easily, and all sorts of circles and maneuvers were carried out. Flights can be made in rapid succession, for the laborious carrying back of the glider uphill is eliminated. In fact, the landings can be made exactly at the original starting place with only moderate skill.

And then there is the sling method in which a ground crew of six or eight men, three or four on a side, take the 150 feet of five-eighths diameter shock cord and run in an open Vee, stretching the cord out, while three others hold the tail, releasing only when the pull becomes too strong. This form of sling or catapult enables embryo pilots to cover one to three hundred feet on level ground, attaining altitudes of fifty to seventy-five feet.

The airplane towing method is by far the most hazardous, and should not be attempted except under very careful supervision. Propeller wash, bumpy weather, critical flying speeds, misunderstandings between pilots as to maneuvers, all add to the difficulties of this sport, but Cleveland certainly was shown how it ought to be done.



Glider flights at Cleveland. Primary and secondary types in action

The First National Glider Meet has been an unconditional success. Demonstrations were cleverly accomplished, contests were run off under real sportsmanlike management. Freak and dangerous types were few and were promptly placed under ban by directors. A spirit of pioneer sportsmanship brought amateur and veteran pilot close together. Distinctions and titles were lost in the shuffle and whoever that student was who shouted up to Captain Hawks as he cruised majestically overhead, voiced the spirit of the occasion. He said, "Atta boy, Hawks!" and Captain exclaimed, "Whoopee! —This is great!"

### THE RESULTS OF THE GLIDER CONTESTS

(Continued from page 72)

W. C. Whitmar. Same ship and pilot. Time: 7 seconds.

Note: As in the first contest, pilots seeking time, grew indifferent to best piloting methods. There was one excellent, five good, three fair, one poor, and one wash-out flights in this event.

#### The Byrd Club of Sioux City, Iowa

No report would be complete without special mention of the high school students from Sioux City who brought their home-made glider on a trailer over a thousand miles to participate in this meet. Frankness forces us to state that their glider "was not so hot" as compared with the standard PTGs used by all of their competitors. It was a truly remarkable machine when it is remembered that the boys built it themselves without adequate blue-prints or assistance.

At the end of the day which saw the end of their hopes and of their ship, the boys met with a truly wonderful reward. William J. (Billy) Scripps, president of Gliders, Inc., presented them completely free of charge with a brand-new PT-2 and sent them home rejoicing. The N.G.A. saluted their sportsmanship even while again warning other boys not to build home-made gliders without proper supervision.

#### Event Number Three

Duration: Auto-towing launching method —PTGs only. Time to count from moment cable is released to moment ship touches ground. A red rag was fastened to the cable within a few feet of where the cable was attached to the ship to assist the timers. The tow cable was limited to from 200 feet to 400 feet. The auto was not to be driven in excess of 35 miles per hour less the wind speed. Ships to enter had to be equipped with manual controls for releasing the tow cable. Not more than two pilots could use the same ship. The distance the auto was to go was limited to a maximum of .8 miles and this was later reduced on the field by prevailing conditions. The course of the auto was indicated by flags placed by the judges. Ships had to land on Cleveland airport to qualify.

#### Results:

Jackson Glider Club. Pilot, Elmer Westerland flying same ship. Time: 1 minute, 14 seconds. Excellent flight with exact return to starting point.

Titan Aircraft Club. Pilot, Kenneth H. Carr flying same ship. Time: 42.9 seconds. Excellent.

(Continued on page 244)



Primary and secondary types of gliders at Cleveland having single and two-wheeled landing gears

Photo by U. S. Army Air Corps.

# ONE DAY'S NEWS

By Don Rose

ONE day, not long ago, I had occasion to skim the news of the day for whatever in it pertained to aviation. The object of the survey was not to count every story which had wings on it, but simply to note those things which were in a measure spectacular. Such minor or prosaic matters as new mail records, aeronautical mergers, airport openings or peak loads on transport services were not to be included. We had to draw the line somewhere.

This, mind you, was for a single day. What did the news turn up?

Well, the *Graf* was half way 'round the world and going strong over some of the queerest corners in the old earth's epidermis. An airplane was about to take off to chase it to Lakehurst. Something changed its mind, but at the moment that was the intention. A plane had just completed a non-stop 'round trip across the American continent, and another was taking off to do better. Two Swiss boys were out over the Atlantic in a bold dash for America, to vanish forever in the attempt.

A candidate for the Schneider Cup had climbed into the sky at a vertical speed of sixty miles an hour, and another had flown more than five miles a minute on the straight-away. An air-cruiser capable of a seven-ton load had just been tested at Washington. A thirty-passenger Dornier was completing assembly at the Philadelphia Navy Yard, and reports were in that Italy was building two twelve-engined jobs to carry a hundred passengers each.

The *Los Angeles* was making its first tests in picking up and launching an airplane in flight. The inventor of the Autogiro had just arrived in this country, bringing with him the latest of his windmills. In New York two planes launched from ocean liners had brought the mail ashore six hours in advance of the ships' arrival at Quarantine.

Three air meets were in progress throughout the United States and the aerial derbies were taking off for Cleveland. And to round out the picture, Congressman W. Frank James of Michigan chose that day to announce that he would introduce a bill to supersede the five-year military air-construction program with one much more comprehensive, because "aviation is coming on so fast that we are left at a standstill."

That was one day's performance in the air, not counting a hundred other acts of less exciting proportions. It is almost a typical program for any nice summer's day in this age of the air. Without giving the imagination three inches of rope, it's enough to super-charge any air-minded head with enthusiasm, and confound the most doubting skeptic with the arguments of plain fact.

The same trick can be worked with local territory. I write this from an editorial cockpit in fair Philadelphia, home of the Liberty Bell and the American League pennant-winners. It's not an air-minded town in the sense that the Westerners use the term. But there's right smart going on. Tomorrow the voters go to the polls to put their O. K. on a million-dollar loan, first payment on a six-million-dollar airport and transportation terminal which won't owe anybody an apology. Fifteen minutes across the river in Camden, Central Airport is getting its last shave and haircut in preparation for big doings at the end of the week, when one of the crack air terminals of the nation—and in fact of the world—will be officially opened for business. A little way down into Jersey a 500-acre racing track was taken over this week for an airport.

The Navy's Dornier had its trial flights here last week. The "Tin Balloon" came by a day or two ago on its way to Lakehurst. Two autogiros—you can't keep that blamed bird out of the news—are flapping around to the north of the city, and a factory is just finished which will employ 300 men in building them. Another one goes up soon in Camden. It's just announced that in a week the secretaries of the New Jersey chambers of commerce will take off by plane to visit the national convention in Milwaukee. The New York to Atlanta air mail operators report all records broken for mail out of Philadelphia to points north, south and everywhere. And so forth and so on.

That's the way the aviation news crowds in today on the front pages, which is the reason why every newspaper of any account has its aviation editor and more-or-less trained reporter to cover the air news. And it's not so long since no pilot made the front page unless he broke his neck. The world moves, my masters,—she do move!

I'm personally and parentally interested just now in the endurance test which took off last week to run for nine months with intervals for refueling. In other words, the kids have gone back to school, which strikes me at the moment as an uncommonly good idea. It has its drawbacks, of course, particularly for those who live in the Daylight Saving belt of these United States. We live in one of those localities where nobody can tell the time in summer without mental arithmetic. Back in the spring someone stole an hour of our beauty sleep and called it Daylight Saving. What it really meant was that we went to bed at the same time every night and got up an hour earlier. When school let out we quit worrying about it. The youngsters went to bed when their fuel ran out in the evening, and got up in the morning when they felt like it. According to the books that's the wrong way to bring up children, but it's the only one we can make work.

But when all the teachers came back from Europe, staggering under a load of useless information and picture postcards, the schoolbell busted in again on our pleasant program. Since then we start every day in a line-squall of excitement in the effort to get the school-going section of the family out of bed, through breakfast, and under the wire in time for roll call. Just about the time we get used to it they will be switching the clocks on us again, leaving us stranded in the early hours of dawn with no company but the milkman. And they call that Daylight Saving.

Aside from this, school has its compensations. There are now at least a few hours in the day when we don't have to worry about the boys and their natural gifts for getting into mischief. We don't have to watch the windows, the tool box, the cookie jar and the neighbors' sensitive feelings quite so closely. Instead, we comfort ourselves with the thought that the young pirates are getting educated, by gosh, and we hope some of it sticks.

At the same time we know by personal experience and observation that it takes a lot more than school to make a citizen. A boy learns more by way of his own appetite, curiosity and meddling with things which don't rightly concern him than any professor can pound into him with a trip-hammer. Having done a little pedagogic pounding myself, I feel sure of it. The principal thing my former pupils have done with all I taught them is to forget it. I console myself with the fond hope that I never did them any harm, even if I didn't do them much good, and I'm certain there are a dozen silent

(Continued on next page)



teachers at work on a boy for every one who shakes a ruler in his face at high school.

There was once a writer named George C. Jenks, and he died on September 13th at the ripe age of 79. He was the author of some hundreds of stories of Diamond Dick and Nick Carter, and nobody ever called him an educator. He was called a good many other things by panicky parents who thought his yarns would make bandits and gunmen of the young hoodlums who hid behind the barn and in the attic to read of the brave days of old, when Indians bit the dust and everybody got saved in the nick of time or not at all. But it's a fairly safe bet that Mr. Jenks did more to shape the destinies of his young readers than did those who pumped them full of punctuation and parts of speech in the crossroads schoolhouses of those days. Looking backwards now, we can figure that the hair-raising yarns he turned out by the dozen weren't such bad training as they seemed to be. Virtue was always rewarded in them, the villain always got his, the lovely maiden never lacked a rescuer, and courage rated top-notch among the manly qualities. And the kids liked them. They ate them up.

Those were thin days for boys. Lots of them had to earn their keep as soon as they were old enough to be worth keeping. School was a place of dull studies and sore knuckles. Circus once a year was entertainment and a nickel was pocket-money. The *Youth's Companion* once a month and a dime or nickel novel whenever you could get it were adventure, romance, travel, literature, art and science all at once, and not enough of them at that. No wonder they loved Diamond Dick and Nick Carter and learned their stories by heart, no matter what happened to spelling and geography.

The things a boy loves stick to him like burdock seeds or devil's pitchforks to his best trousers. And I wonder now and then what all this aviation excitement is doing to the generation which must carry on the world when present shoulders are too weary for it. For the age of the air is a small boy's paradise. It has everything he wants, including adventure, excitement, brave deeds, pioneering, record-breaking, romance, noise and machinery. His imagination goes soaring after every passing plane and his fingers itch to tinker with the engine which makes it go. He gets the taste and thrill of it in the stuff he reads, the movies that take most of his pocket-money, and even in the toys which his little brother leaves around the floor for father to fall over. Older folk, with side-whiskers for blinkers and the sense of responsibility for a check-rein, may be able to walk through the world more or less untouched by all this aerial excitement, but the small boy takes it right in the solar plexus.

So a lot of them, no doubt, went back to their desks under protest, wishing that their loving parents had sense enough to send them instead to ground school or to a bench in an aviation factory. They have my sympathy and respect, and I hope they find at least one teacher on the faculty who will put wings on his subject and hitch it to the star of their pet hobby. It can be done with

physics, geography, mathematics, social science and lots of other peculiar subjects, and the wise teacher won't miss a chance to connect these necessary sciences with the real world which is buzzing inside and outside the head of a boy.

For these same boys I have a story to tell, provided the editor doesn't mind. I got it right from the chief actor, who probably wouldn't tell it in public himself without a lot of coaxing. His name is Juan de la Cierva, and he is the inventor, builder and chief pilot of the Autogiro, a contraption which is causing considerable excitement in the industry just now.

I have nothing to say about the Autogiro. Every time I try to explain it to a friend I finish up by making circles in the air and stalling my vocabulary, so that my friend goes away quite certain that the thing won't fly. After I have tried to give a really scientific explanation of it, I'm certain it won't fly myself, even though I've seen it do it.

Senor de la Cierva is 34 years old. He remembers when the news of the Wright brothers' first flights reached his home in Madrid, and started him on his aeronautical experiments. When he was 12 he was studying everything he could find relating to kites, gliders and planes, and at the advanced age of 14 he built a glider and made it work. It was a real glider, with controls and everything. Since there was no high cliff in the neigh-

borhood for a take-off, the glider had to have an engine, and the engine consisted of all the small boys in the neighborhood on the end of a 500-foot rope. It worked fine until one day the engine stopped to watch the flight, which ended the flight quite suddenly and convincingly.

A year later he and two other lads built the first plane ever constructed in Spain. They made it out of the remnants of a barnstorming Farman, which had been so thoroughly separated in a crash that nobody else was interested in the pieces. They made a deal with the pilot to rebuild his ship on a new design and make it work, after which he could have it back again. At a total expenditure of about sixty dollars and with some help from the pilot, they did the job.

They whittled out spars and struts, patched the fabric with canvas and stretched it as best they could, and doped the ship with ordinary glue. They discovered later that in wet weather their plane was the stickiest ship that ever flew, but at least it flew. Their biggest problem was the propeller. The original prop had been busted beyond repair, but it seemed quite advisable, if not absolutely necessary, to have a propeller.

The young inventor looked around for seasoned wood, and found it at last in the bar of a Spanish saloon,—a fine piece of timber thoroughly seasoned with alcohol. Out of it the boys hacked and chiselled their propeller. It vibrated a little in flight, but there were so many vibrations in the ship that a few more made practically no difference.

Anyway they got the plane together again, and the French pilot said "thank you" and flew it away. That was when Cierva was fifteen. At the age of 17 he built his second ship, a monoplane.

(Continued on page 300)



P. & A. Photo  
Harold F. Pitcairn and Juan de la Cierva. The latter is in the cockpit of the autogiro

...sport...  
...the mon...  
...noticeable...  
...plied. I believe also...  
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...tions point to the fact that the Uni...  
...States is fast forging to the front...  
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### Dust Raised by Planes Annoys Westchester

#### County Threatens to Close Bar- rett Airfield Unless It Stops

Special to the Herald Tribune  
WHITE PLAINS, N. Y., Aug. 21.—  
With the filing of two more complaints  
against the dust raised by airplanes  
on Barrett Airfield, at Barrett,

District Attorney, of West-  
chester County, threatened today to  
close the field unless steps were taken  
to abate the dust nuisance.

Residents of the vicinity of the field  
have protested for the last several weeks  
against the propellers of planes on the field  
raising clouds of dust which were  
considered annoying in summer when  
windows are open.

and Charles F. Barrett, who live across the state road from Barrett Airfield, complained today to the Chief Assistant District Attorney, and said that the situation has continued for more than a year, despite repeated conferences with the field officials.

conferred later with Barrett, who said he would wait several days and that if the field were not closed, other steps would be taken to keep the dust down. He would close the field if the dust started again.

—New York Herald Tribune,  
August 22, 1929.

# TARVIA

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Barrett engineers know how to utilize local materials to build smooth, firm, dustless Tarvia aprons and resilient, skid-safe, all-weather Tarvia service roads and runways at a cost within the limits of almost any airport budget.

All the 25-year paving expertness and country-wide service of The Barrett Company is available to the airport engineer. Phone, wire or write our nearest office.

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St. Louis	Minneapolis	Boston
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Providence	Syracuse	Milwaukee
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# Tarvia

FOR ROAD CONSTRUCTION  
REPAIR and MAINTENANCE



# PERSONALITIES



"I DON'T want to be the best pilot in the world—I want to be the oldest!" This statement, repeated many times by many men, was made originally by one Richard Hennery Depew, sales engineer for Fairchild Airplane Manufacturing Corporation, which builds airplanes out in the wilds of Farmingdale, Long Island. Just why anyone should want to grow old in Farmingdale escapes me; why, even he should tolerate life at all in that melancholy burg is beyond the most penetrating powers of my intellect. But Richard Hennery, perchance enamoured of the Vast Silences of that Lonesome Land, wishes to grow old there; and with this odd wish held firmly before him he has flown, cautiously and ever more cautiously as the years advanced, carrying, like that Swiss youth of old, a banner with this strange device: "Low and Slow. Not the Best Pilot—Merely the Oldest."

Dick Depew's caution has become proverbial. "As safe as Mother Depew," we would say of a pilot who never took a chance. Let a cloud appear in the sky; let a breeze, more than gentle, waft itself across the field, and Richard would be off to the cyclone cellar. There he would wait, no more than one red eyebrow sticking through a crack in the door, until the wind had died down to a calm as flat as life in Farmingdale. To learn, then, after all this lifetime of excessive caution, that the careful Richard had leaped from an airplane at a height of 11,000 feet into a solid flock of clouds and had come gyrating down attached to a parachute, after the manner of a potato bug clinging to a falling leaf, was to experience the same feeling of amazement that I would feel if a small white rabbit suddenly leaped up and barked at me. I could never imagine Richard doing such a thing; more, I could not conceive how he had managed to get himself into the incautious position which rendered such a desperate maneuver necessary. Filled with curiosity, which, next to eating and drinking, is the predominant passion of mankind, I wrote the daring Depew for particulars. These he forwarded instantly, in a letter of some ten pages, giving his experiences from the cradle to the point where he had been forced to take the leap for life, and continuing it to the point in the farmer's back yard where he had descended among "Barnyard litter of straw and chaff, And much that wasn't so sweet by half," to quote the sad finish of one Darius Green and his Flying Machine.

Boiled down to its essential elements, the Depew Saga goes about like this: Richard was bound West in a Fairchild 71 with A. A. Woodruff, Jr., as passenger, when he encountered several rainstorms between Reading, Pa., and Johnstown, of the same state of political purity. Nothing daunted, the bold Richard pursued his wet and weary way across the mountings, until about 20 miles east of Johnstown, where said mount-

ings are about 3,900 feet high in spots. Here the clouds came in solid between the earth and Richard, who was plowing along at some 5,000 feet, to avoid hitting trees or low shrubs. However, he felt no tremor of apprehension; for, said he, "It's a long cloud that has no turning, or at least a hole in it." So on he went, partly by compass and partly in the hope that eventually he would smell Pittsburgh through the fog even if he couldn't see it.

Unfortunately, just above him was another layer, also quite solid; and, doubly unfortunately, there seemed to be an attraction between the layer above and the layer below. Perhaps the attraction was Dick—I don't know—but the sad fact remains to be tabulated for posterity that these two layers came together, squashing Dick between them. He now flew blind, and, not having with him the Crystal Gazing Device for Blind Flying invented by THE GREAT BEHNCKE, Richard was at a loss what to do. He figured he was not only at a loss—he was very likely to *prove* a loss. There he was squashed between these two layers, like a hot dog between the upper and lower berth of a bun. He found him-

self barking sadly to himself in his quandary, whatever a quandary is. However, he writes, he sat in his quandary, barking gently, and climbing up to where he could see the sun once more. He never saw it, not that day. "We could see absolutely nothing whatever," he writes pitifully. "I did not dare try to come down blind through the clouds over those mountains, and could not seem to climb out of the storm, so after 20 minutes of this sort of thing we decided to take to the life boats." And now, hold onto your seats, folks—the excitement is only starting. Hand grandma the smelling salts before you read her this:

"Fortunately I had showed Woodruff how to pull the ring, if necessary, and on the way out we held a sort of impromptu fire drill. That is, I told him if we had to use the 'chute that he should make his exit gracefully from one of the rear doors and I would endeavor to do the same from the front door—that if we both tried to get out of the front door that someone would be killed in the rush. As per the fire drill we got out, Woodruff out of the back door, I out of the front door. But you can imagine my embarrassment when I found myself draped beautifully on my stomach like a clothes-pin over the wing struts, jammed between them and the side of the fuselage, with my feet kicking around in several thousand feet of clouds. What was even more annoying, sheets of rain were descending all over me, spoiling the crease in my trousers, and I did not even have a Murad!"

If I were running this as a serial in a popular magazine, I'd cut at this point and put in brackets (To Be Continued.). I'd like to leave Dick draped over those struts until the next issue. But just to keep my most gentle reader, Miss Alice Yost of San Francisco, from having a conniption fit, I'm reluctantly forced to admit that Richard wriggled himself out, fell away into space, at regular space rates, Alice—two cents a word—and pulled the magic ring. Upon which there was Woodruff and Depew and the doomed 71 all whirling around and descending together; and, says poor Richard: "The Airplane was circling around and then coming straight at me. I had read of this business of side-slipping the parachute, and all I can say is, 'It's a good trick if you can do it.' The plane came within 200 yards of me, then veered off, made one big circle, and crashed into a hillside." This was at 1,500 feet, and under the clouds, so Dick had more ceiling than he had imagined. However, who can tell in advance? Nobody. And in a period of apparent overproduction of airplanes anything that will give relief, even to the extent of only one plane, is a blessing, isn't it?

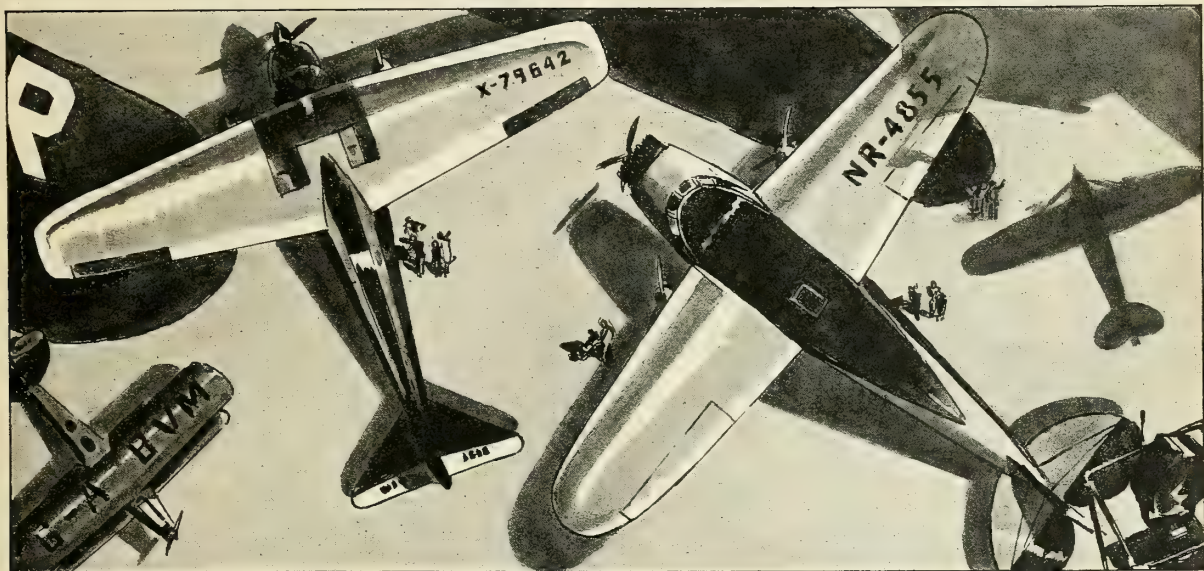
Then Richard made a horrible discovery. He found himself drifting backwards with the wind and down a steep hillside. To land

(Continued on next page)



Richard Hennery Depew, parachutist

# Flashing Bodies — Luxurious Interiors — Modern Styling that SELLS Aircraft



**T**ODAY aircraft makers place new responsibilities on the manufacturer. Commercial air transportation calls for added passenger comfort. Not only must your ships progress in mechanical design—but now, they must also constantly improve in luxury and styling.

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(PersonAIRlities continued)

in this position was unthinkable, so by a series of calisthenics he twisted the shroud lines and made a three-point landing in a farmyard. Woodruff meanwhile had landed in his extremity, or on it, I should say, and his heels, in a plowed field. But let Richard continue: "While looking for Woodruff I met the undertaker charging furiously up this mountain road with his hearse. Upon assuring him that there was no business, we managed to get him to wait long enough to take our baggage, the tools and a few small parts and the parachutes down to the town in his hearse. That's the first ride in a hearse I've ever enjoyed—I hope the next is equally pleasant."

THERE are two patient airmen of Cleveland to whom the better looking half of my family owes a debt of gratitude for teaching her to fly. The first is Hal Emerick of Dungan Airways, who soloed her in a Waco, which survived the experiment; and the second is David R. McCauley, director of the Universal Flying School, Cleveland, who introduced her to the art of piloting a Fleet and a Robin, both of which, after many expensive hours in the air, she returned to Universal intact. I take this opportunity of publicly thanking these two excellent and patient instructors for accomplishing what I never could have done myself, for no married man can teach his own wife to drive a Ford, let alone an airplane. I did try on the Ford—and all Myrle learned were a few new words—so I wisely turned her aerial instruction over to two gentlemen who had not been handicapped by a marriage license.

Since Dave didn't give me a photo of himself, I'll illustrate this thumb-nail biography of his by using a picture of his first woman pupil, taken after her first solo in a Fleet.



The better-half and yours truly—Cy.

She is, you will observe, laughing heartily over the happy outcome of the event, while I am registering pleasure in the thought that her further antics in the air will cost me only \$20 an hour instead of \$25. I'm glad to print this picture so my six readers will form a more nearly correct impression of what I unfortunately look like. I've always kept my picture out of AERO DIGEST, believing that it would dull reader-interest. But in the last two issues the



J. B. Machle, Jr., W. R. Henderson, and the Chinese version of a Stinson-Detroit

malignant Editor of this journal saw fit to malign me by illustrating my articles with the pictures, first of an Irish fisherman, and second of an ancient German cab-driver, neither one of whom resembles me even slightly. This was more than even I could stand, so I hurl this picture of the boss and me at the Editor with the demand that he print it or get sued for libel. (You wouldn't dare sue me, after what I got on you in Cleveland last month! Ed.)

David R. McCauley, protector of chickens just learning to fly, was born and raised in Maryland, where he could have before him that sterling example to the youth of the land, Major Bill Bun-hurling Tipton, of the Air Corps, Maryland National Guard. Watching Bill Tipton throwing buns at banquets so stirred young David, named after a biblical character who had thrown a bun (or was it a stone?) at a chap named Goliath, that David joined the Guard in 1925 so that he, too, might throw buns. The Army, sensing that here was one who needed more space for his efforts, sent him to Brooks Field, Texas, where he could throw a bun or an airplane miles and hit nothing but a steer. Here he became so proficient that he was graduated and barnstormed along the Atlantic Coast from Massachusetts to North Carolina for a year and a half. He bought his own ship and continued barnstorming with a school and sales organization until 1929, when he sold out and joined the Department of Commerce as aeronautical inspector, then joined Universal School of Flying in St. Louis and is now Director of the Cleveland school. Recently he was granted leave of absence to do a series of tests for the Bureau of Standards at Washington, flying a plane used in experiments with radio directive and landing beacons. He has had a Transport License since 1927 and has had over 1,400 hours in the air, and—can you believe it?—he was honest enough to say that he had two major and two minor crashes. How few admit those painful events! There should be a special medal for pilots brave enough to admit those things. On his third flight after graduation at Brooks he had the rear throttle stick on a Jenny. He was at 4,000 feet, and decided to climb to the front cockpit. This sounds like a very simple thing to do, but it seems that he was a very slow climber or the Jenny a very fast diver, for when he completed the transfer and pulled out of the dive he was only 200 feet above the ground! But at that I don't think he was any more nervous than he was on the day when he watched his first woman pupil go solo in a Fleet.

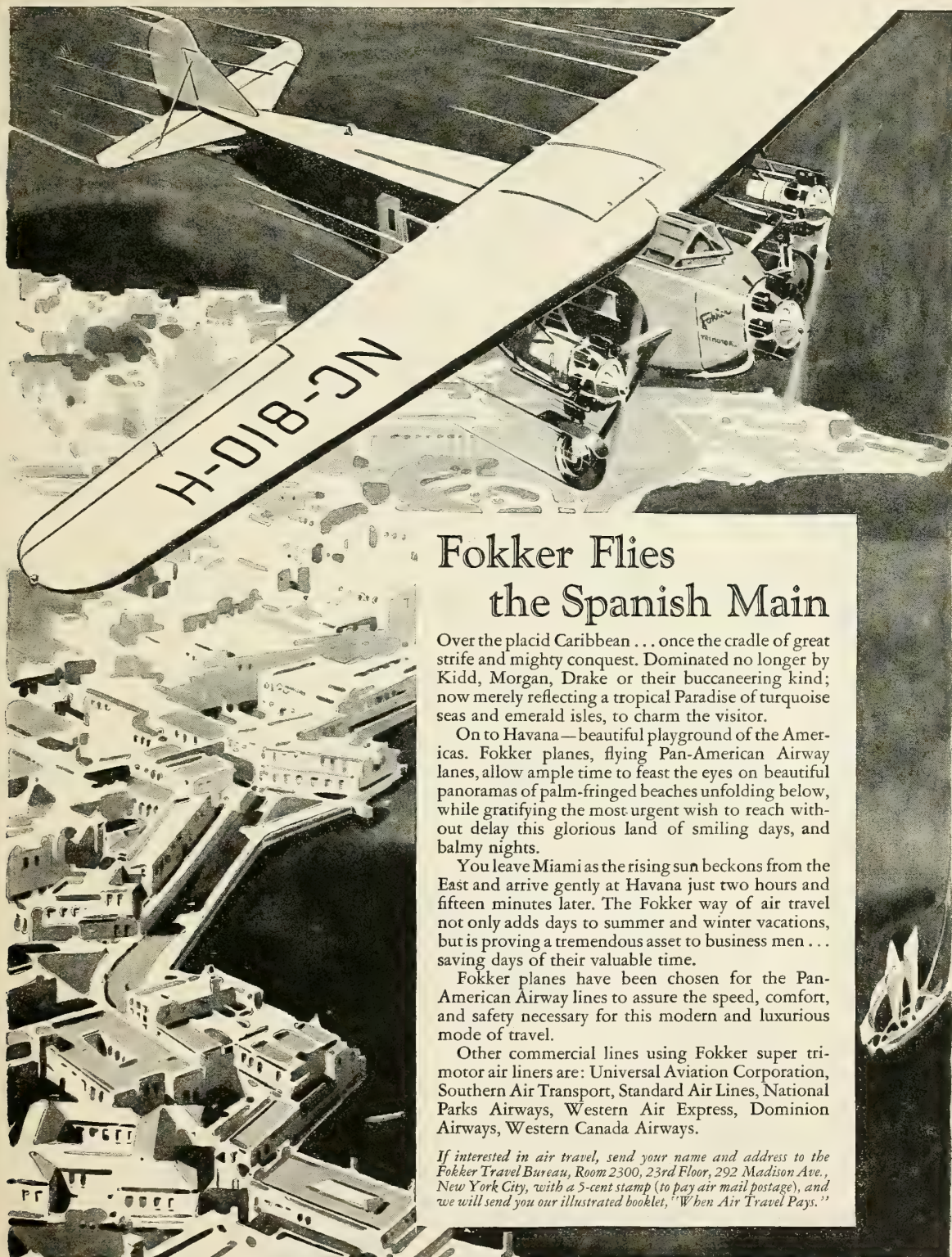
THE accompanying photo of J. B. Machle, Jr., and W. R. Henderson, pilot instructors with Shanghai-Nanking Air Lines, shows what happens to a Stinson-Detroit when it lands in China. A Chinese artist gets busy with a large paint brush and paints a laundry check on the side of the ship. Over in China, it appears, you can either fly a Stinson-Detroit or turn it in and get somebody's laundry in exchange.

Last July Henderson inaugurated the first air mail between Shanghai and Nanking, since which the only letter I have received from him contained an unpaid bill from the Hotel Plaza, Shanghai, Bar Room for 40c for a package of Chesterfields. I refuse to believe that all he bought was cigarettes—the fact that he sends me the bill leads me to that belief. "You might tell the folks," he says, "that China is a wonderful country to fly in. The air is fine, better than I expected to find it and better than it is in a lot of countries where commercial aviation is an old story. We took off from the Hungjao field through six inches of water the day after the hardest rain they had had in Shanghai in 58 years, but the Stinson walked right off and didn't seem to mind. We will be using pontoons shortly. The country is terrible—no fields at all."

PILOT L. F. HUGHES, of the rising town of Fort Lauderdale, Florida, is the original Hard Luck bird of those parts. He writes: "Have found a new way of moving a ship from Wheeling to Florida. I have to drive my wife and two children here, then go back by train for the ship. Last year that method was very expensive, as I was delayed five weeks on account of weather, and besides, crashed at Clarksville, Tenn. Ran out of gas, made a forced landing (my fifteenth!), then the fun began on taking off. A muddy field, 300 pounds of baggage and parts resulted in a spin at 400 feet. No serious injuries, but a nice crash. I have changed that system. I hooked the damn plane on my car by building rack for wings on top and used fuselage for a trailer. Even put a tail light on it. Well, we, meaning wife, two children, and a professional parachute man, arrived here in eight days. Wagner made a jump here and lost his parachute in the Atlantic Ocean. Outside of that we are well and happy."

You are, are you? Just what you have to be happy about sort of escapes me. You have 15 forced landings, one crash, one wife, two kids, and a parashooter without a parachute—and on top of all that you drag a dismembered airplane for 2,000 odd miles. And you're happy! Pollyanna had nothing on you.





## Fokker Flies the Spanish Main

Over the placid Caribbean . . . once the cradle of great strife and mighty conquest. Dominated no longer by Kidd, Morgan, Drake or their buccaneering kind; now merely reflecting a tropical Paradise of turquoise seas and emerald isles, to charm the visitor.

On to Havana—beautiful playground of the Americas. Fokker planes, flying Pan-American Airway lanes, allow ample time to feast the eyes on beautiful panoramas of palm-fringed beaches unfolding below, while gratifying the most urgent wish to reach without delay this glorious land of smiling days, and balmy nights.

You leave Miami as the rising sun beckons from the East and arrive gently at Havana just two hours and fifteen minutes later. The Fokker way of air travel not only adds days to summer and winter vacations, but is proving a tremendous asset to business men . . . saving days of their valuable time.

Fokker planes have been chosen for the Pan-American Airway lines to assure the speed, comfort, and safety necessary for this modern and luxurious mode of travel.

Other commercial lines using Fokker super trimotor air liners are: Universal Aviation Corporation, Southern Air Transport, Standard Air Lines, National Parks Airways, Western Air Express, Dominion Airways, Western Canada Airways.

*If interested in air travel, send your name and address to the Fokker Travel Bureau, Room 2300, 23rd Floor, 292 Madison Ave., New York City, with a 5-cent stamp (to pay air mail postage), and we will send you our illustrated booklet, "When Air Travel Pays."*

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# EARLY BIRDS OF AMERICA

TO those of the puerile younger generation who don't know what an Early Bird is, I rise to state that an Early Bird is the man who made the first airplanes fly; the man who flew the pre-war vintage of aeroplane when the present generation of pilots were toddling about the back porch in bib and romper; the man who sat on the front edge of an open-work box-kite and dared the thing to fall apart; the man who, well, anyway, the man who was an old-time flier when the war broke out.

The organization came into existence somewhat as follows: In the fall of 1928, P. G. B. Morriss and Ernest Jones were en route to the air races at Los Angeles, and landed at the field of the Scenic Airways at the Grand Canyon, in order to look over the largest hole on earth, as well as try out the sightseeing service of the Scenic Airways. They took off bright and early one morning and spent an enjoyable hour in chinning and looking at said hole from the rear seats of a trimotored Ford. The magnitude of this cut on Mother Nature's scalp and its emptiness recalled to these old-timers the emptiness of their pockets while trying to make a living building and flying airplanes twenty years ago. This sad recollection recalled the memory of other old-timers, and Morriss asked Jones if it would be possible to get a record of old-timers that would make possible the forming of an association of pioneer pilots.

Later, on the way west, the matter was discussed pro and con and, upon returning to the east, Jones got together the names of quite a number of old-timers who were willing to become members of an organization committee.

From that time until December, 1928, a girl was put to work on tracing the names and addresses of those with whom contact had been lost and, by the time the Chicago Aircraft Show opened in December, about one hundred prospective members had been located. Notices were sent out and between forty and fifty attended the organization meeting in Chicago at the Stevens Hotel, where our present constitution and by-laws were adopted paragraph by paragraph, after much discussion, on the morning of December 3rd, 1928.

A great deal of time was spent in determining the

By Jack Whitaker

Member of the Early Birds



qualifications of membership and, up to that time, it was supposed the organization would be known as the "Association of Old-Time Airmen." During the meeting, Morriss suggested the name of Early Birds, which was unanimously adopted.

Articles of incorporation were drawn up in Washington shortly afterward and the organization began to function in a more or less desultory manner, while we were

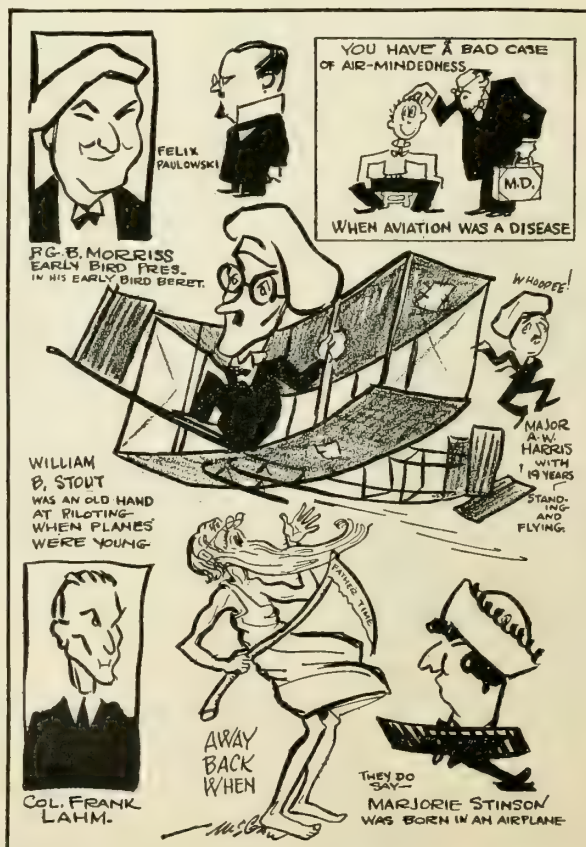
still spending most of our time in tracing a large number of members who were eligible but whose addresses were unknown.

At the Chicago meeting the question of time limit of qualification was taken up most thoroughly and, although a few of the members of the Committee wished to set the date back to 1912 or 1914, the consensus of over ninety per cent of those present was that the date should be held at 1916 for American citizens and that for nationals of other countries, the date should be prior to the outbreak of the World War. This places eligibility for membership for America within the first thirteen years of dynamic flight. The dates set were not the result of any one or two persons, for the matter was thoroughly threshed out and voted on, and the records show that the motion to set the date at 1916 was almost, if not quite, unanimous.

In accordance with the provisions of the constitution and the by-laws—quoting from Section 1 of Chapter V, "Membership shall be limited to those who piloted a glider or airplane, gas balloon or airship prior to December 17, 1916, upon evidence deemed sufficient by the Membership Committee and approved by the Board of Governors, except that Nationals of countries other than the United States engaged in the World War must have met the foregoing conditions prior to August 4, 1914."

Though a meeting and dinner was held at the New York Aviation Exposition in February, 1929, and another in Los Angeles, the first actual national migration and banquet was held during the National Air Races at Cleveland, where about 150 Early Birds were present.

The membership now is 216; and, of some 400 odd names which have been traced and who are eligible for membership, so far it (Continued on page 263)



Courtesy of the Cleveland News

As the artist saw the Early Birds in migration at Cleveland

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# THE 1929 NATIONAL AIR TOUR

**M**ORE than forty-five airplanes will be on the line at the Ford Airport in Detroit, Saturday, October 5th, to begin the 1929 National Air Tour for the Edsel B. Ford Reliability Trophy. There have been four previous National Air Tours, but none of them has approached this year's in number of entries. The largest previous field was in the 1926 tour, with twenty-five entrants.

The tour itself is an experimental and proving laboratory for the aeronautical industry as a whole. The course of flight traverses twenty-one states and passes through thirty-two cities of this country and Canada. Four Canadian cities and two provinces will be visited.

Such a group of representative airplanes has probably never before been assembled in a single fleet for a demonstration tour. Thousands of persons will see for the first time three of the famous Autogiro planes, the invention of Juan de la Cierva of Spain. De la Cierva has announced his intention of flying one of these planes himself. Two of them have been entered by the Pitcairn company, which holds the rights to build these planes in America. Multi-engined transport planes—including the new Curtiss Condor—will be on the tour. Intermediate transport planes, mail ships, training and sport planes will make the trip.

Captain Ray Collins, who was tour referee on all previous National Air Tours, has been appointed tour manager this year. Captain Frank Hawks has been appointed tour referee. Captain Hawks is holder of both the east and west non-stop transcontinental speed records, and he recently established the speed record for a one-stop transcontinental round-trip. He will accompany the tour in his Lockheed Air Express, with which he achieved his record flights.

A prominent pilot, long identified with all phases of aviation, Captain Collins, is director of the newly-created Michigan State Board of Aeronautics. He also is manager of the aviation department of the Union Trust Company of Detroit. During the recent 1929 National Air Races at Cleveland, Captain Collins was assistant starter.

It is hoped that President Hoover will greet the tour at two points during the trip. On the 15th of the month, the President plans to be in Cincinnati to dedicate a memorial shaft. The tour leaves Cincinnati on the morning of that day, after an overnight stop. The finish of the tour was so arranged as to fall on October 21, the date of Henry Ford's celebration in honor of Thomas A. Edison and "Light's Golden Jubilee"—the fiftieth anniversary of the invention of the incandescent electric lamp. President Hoover will be among the prominent national figures who will be Ford's guests, and the return of the tour airplanes will be a major event in the day's program.

The spirit and purpose of the tour is one of fair competition designed to further civil aeronautics. No government planes are permitted to enter. Civilian constructors and pilots of this country and other nations have been encouraged to enter.

An efficiency handicapping and formula system is employed to insure every competing pilot a fair basis of competition. This is worked out for each plane in preliminary tests made at the Ford Airport by contest officials who are not connected with or interested in any make or type of plane or engine. This operation gives every plane equal opportunity to win regardless of type, size, power or speed.

Each airplane entered in the National Air Tour must be capable of a speed in excess of eighty (80) miles per hour with a full contest load, and is required to demonstrate this speed before being allowed to compete in the tour.

The contest load is the load which the entrant desires to put in the plane providing the following load conditions exist to the satisfaction of the contest committee:

Under no circumstances may the contest load exceed the maximum useful load permitted by the Department of Commerce under the Approved Type Certificate awarded the ship. This contest load may consist of passengers, inert and useful ballast, or both, and must include the weight of the pilot and the weight of gasoline with the tanks full. Tools, spare parts, cockpit covers may be included in the contest load when properly sealed and marked.

The contest committee requires each plane to qualify by flying four times over a measured course of approximately one mile, twice in each direction, to establish maximum speed to be used in the formula.

## FORMULA:

$$\frac{\text{Max. Dept. of Com. Useful Load}}{\text{One-half Stick + Unstick}} \times \frac{\text{Max. Speed 50}}{\text{Disp.}} = \text{Merit}$$

The winner of the tour will be the contestant who has the highest number of points at the completion of the tour. For the purpose of determining this, the points of each lap of the tour will be figured separately and the totals added to obtain the aggregate. Second position will be awarded to the contestant having the second highest number of points under the formula used for determining the winner, and the third will have the third highest number of points and so on down until all remaining contestants are accounted for.

Contestants will be given the starting signal at one-minute intervals after the time designated for the departure of the first plane. This method will govern the start at each control throughout the entire tour. After the official start at Dearborn, the sequence of starting will be determined inversely by the time of arrival at the last night control station. In this manner, the last plane to be checked in at a night control station will be the first to depart on the next leg of the tour.

In addition to the Edsel B. Ford Reliability Trophy, which will be awarded under the provisions of the deed of gift to the winner of the contest, there will also be the following cash awards:

To the plane making the best showing and obtaining the highest aggregate number of points, \$2,500; to the plane obtaining the second highest number of points, \$2,000; third, \$1,750; fourth, \$1,500; fifth, \$1,250; sixth, \$1,000; seventh, \$750; eighth, \$550; ninth, \$400; and tenth, \$300. Each competing plane finishing the tour on the final day and not placing among the first ten will be given a bonus of \$200.

The distance to be traversed by the competing planes this year will be approximately 4,850 miles, ranging from Portland, Maine, to Jacksonville, Florida, along the Atlantic seaboard and thence across the middle western states as far as Wichita, Kansas.

## Itinerary for 1929 National Air Tour

Windsor, Ontario	.....October 5.....	Saturday	noon
Toronto, Ontario	.....October 5.....	Saturday	night
Ottawa, Ontario	.....October 6.....	Sunday	noon
Montreal, Quebec	.....October 6.....	Sunday	night
Portland, Maine	.....October 7.....	Monday	noon
Springfield, Mass.	.....October 7.....	Monday	night
New York, N. Y.	.....October 8.....	Tuesday	noon
Philadelphia, Pa.	.....October 8.....	Tuesday	night
Baltimore, Md.	.....October 9.....	Wednesday	noon

(Continued on page 242)

# 40 Twice-Tested

## AERONAUTICAL RUBBER PRODUCTS

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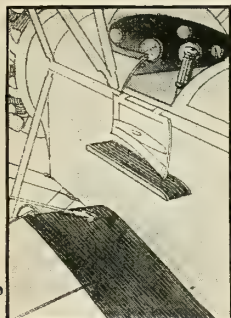
**F**ROM nose tip to tail wheel Goodrich lends its name to forty twice-tested, Goodrich *branded* products made of rubber for aviation.

Tires, propeller covering, hose,

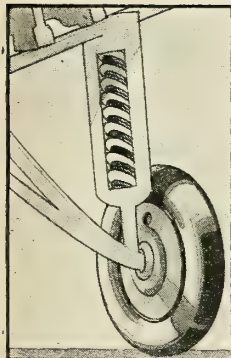
handle grips, rubber matting, shock absorbers, shock absorber coil, grommets, aero board, tail wheels . . . are among the forty aviation items Goodrich manufactured and tested—first in its laboratories . . . then in Goodrich's own "flying laboratory" of the air . . . an airplane of the latest type.

Equipped with Goodrich Split-Second Silvertown Airplane Tires, record-breaking planes were piloted by Lindbergh, Goebel, Hawkes, Kingsford-Smith, Brock and Schlee, and Chamberlin. At the four major aircraft shows *this* year Goodrich equipped planes lead all others as they *consistently have done* in the past! These forty standard, Goodrich *branded* aviation products can be purchased from *any* Goodrich aeronautical distributor.

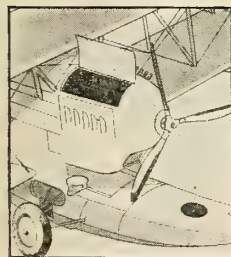
The B.F. Goodrich Rubber Co., Established 1870, Akron, Ohio. Pacific Goodrich Rubber Co., Los Angeles, Calif. In Canada: Canadian Goodrich Company, Kitchener, Ontario.



Look for Goodrich rubber matting on step and cockpit floor . . . Your hand will never stick to a Goodrich handle grip.



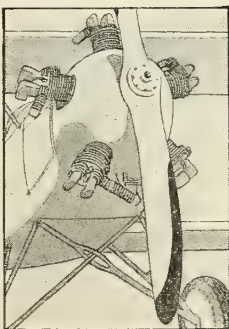
Split-Second Silvertown Tires are *light* enough to permit you to carry three extra gallons of gas without increasing the wind drag. Shock absorber cord makes safe landings easier, safer.



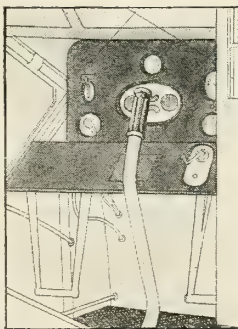
Goodrich pontoon handhole covers have handles. Red and white bands identify specially treated gas and water hose lines.



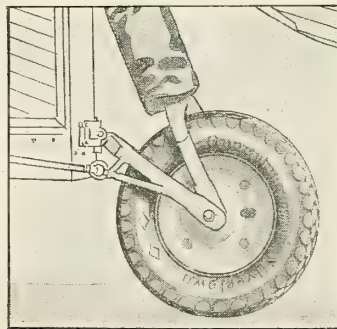
**GOODRICH SPLIT-SECOND SILVERTOWNS**—world records have proved these tires. Tough enough to withstand forced landings. Light enough to carry extra gas. Stream lined to reduce wind drag.



Goodrich rubber that's *ten times as tough as steel* on the leading edge of wood propellers acts as an abrasion resister.



Crash pads of sponge rubber are safety precautions. Air speed indicator hose, grommets, etc., contribute further to the safety of flying.



Goodrich tail wheel tires, as shown on the newer model planes, eliminate back strain and dollies. They come with both smooth and non-skid tread. Smaller sizes of sponge rubber.

# Goodrich Rubber for Aviation



# THE AIR SERVICES

## ARMY AIR CORPS SCHOOLS OPEN

FIFTEEN officers of the Army Air Corps and eleven representatives of other branches of the Army are taking the course at the Air Corps tactical school, Langley Field, Va., during the 1929-30 period. The course began September 16 and will finish June 15, 1930. Officers of the Air Corps attending the school include: Majors Henry J. F. Miller, George E. Stratemeyer, Benjamin G. Weir, and Byron K. Yount; Captains Charles P. Clark, Frederick I. Eglin, H. W. Flickinger, Ross G. Hoyt, Arthur K. Ladd, and John I. Moore; 1st Lieuts. John D. Barker, Robert J. Brown, Jr., James T. Curry, Jr., Chas. McK. Robinson, and Frank B. Tyndall. The students from other branches of the army are: Majors Earl H. Metzger, John E. Lewis, J. M. Moore, Harold G. Fitz, Marshall H. Queensberry; Captains Percy G. Black, Cyril Bassich, Nicholas Szilagyi, Harry L. Branson, James V. V. Shufelt and 1st Lieut. William M. Miley.

Four courses of study are being given at the air corps technical school consisting of the communications, maintenance engineering, photographic, and armament courses. The following air corps officers will attend the communications course from October 1, 1929, to June 30, 1930: Lieuts. Roland O. S. Akre, Linsay M. Bausel, Donald R. Lyon, R. L. Schoenlein, George H. Sparhawk, and William M. Morgan. The maintenance engineering course, which will begin October 15, 1929, and conclude April 14, 1930, will be attended by the following air corps officers: Lieuts. A. B. Ballard, John N. McCulloch, Henry H. Reily, J. H. Atkinson, Leo W. Desrosiers, Ford L. Fair, Herbert C. Lichtenberger and Claude E. Duncan.

The photographic course, which will begin October 1, 1929, and conclude June 14, 1930, will be attended by the following officers of the air corps: Lieuts. J. W. Spry, N. L. Cote, James G. Pratt, and James S. Stowell. Four officers will attend the armament course beginning October 15, 1929, and concluding March 14, 1930. They are: Lieuts. Andrew F. Solter, W. S. Lee, Milton Murphy, and Arthur G. Hamilton.

### Application Exams for Flying Cadets Not to Be Given in December

THE written examinations of flying cadet applicants planned to take place in December of this year has, upon the recommendation of the chief of the air corps, been dispensed with by order of the Secretary of War. This action was taken because of the large number of candidates now on the eligible list and the relatively small number to be appointed in the October class, due to the exceptional number of West Point graduates to be trained in that class.

THE flying branch of the material division of the air corps, which occupied temporary quarters at Fairfield since the division was moved from McCook Field pending the completion of the new hangars, is now installed in its new quarters at Wright Field. The office forces are now fully established, and the hangars are filled with planes. Flying operations from now on will be conducted from Wright Field.

## ALASKA EXPEDITION FINDS POWER SITE

A POWER site of more than 20,000 horsepower has been discovered in the Tongass national forest, southeastern Alaska, by the Alaska aerial survey expedition. The Alaskan aerial survey detachment, representing cooperation between the Navy, Agriculture, and Interior Departments, went to Alaska in July for a continuation of the task of making air pictures as a basis for maps of certain areas of that territory. It is in charge of Lieut. Comdr. A. W. Radford. Other members of the party are Lieut. E. F. Burkett, executive officer; Lieut. Comdr. A. C. Smith, medical officer; Lieut. Thomas Machlin, in charge of the airplane tender, and Lieuts. R. F. Whitehead, C. F. Greber, L. P. Pawlikowski, and E. F. Carr.

Besides the discovery of the power site and mapping of the unknown territory, the aerial survey is expected to prove extremely valuable in connection with power development for the manufacture of wood pulp on the Tongass Forest. Lakes, streams, and other important topographic features of the Tongass Forest, the existence of which hitherto has not been known, have been revealed by the survey of the forest from the air.

The need for accurate maps of southeastern Alaska is imperative in connection with prospecting and mining, commercial fishing, lumbering, waterpower development, and industrial utilization of the resources of the region in general. The extended investigation of timber and water-power resources now being made as a preliminary step in the prospective establishment of a paper-making industry in Alaska has greatly accentuated this need. The Tongass national forest contains a vast amount of pulp timber—enough to supply 25 per cent of the newsprint needs of the United States in perpetuity.

Before the aerial survey expedition began its work none of the greater part of the land surface of southeastern Alaska had ever been surveyed. The shore lines of the islands and the mainland had been delineated, but farther inland the maps were largely blank, even within one mile of tide-water. In 1926 a total of 10,000 square miles was mapped. It is anticipated that an equal area will be covered in 1929, and this will complete the work to be done in this region.

## BOOSTER MAGNETO FOR NAVY PLANES

THE Power Plant Design Section of the Navy Department recently announced the development of a new integrally mounted booster magneto to aid in the starting of airplane engines. The new starting device is being produced by the Eclipse Machine Company.

This device is similar to any other magneto as far as electric characteristics are concerned, but differs in size, location and operation. It weighs 4¾ pounds, and is about the size of a man's fist. As the name implies, the device is mounted integrally with the starter case. It cannot be mounted on the standard type of starter, because it is driven through gears; consequently the starter must be specially equipped with a mounting flange and with various additional parts such as engaging dogs, gears, and gear housings. The gears are arranged to mesh with the inertia wheel.

THE naval air station at Sumay, Guam, recently reported the construction of a channel and ramp so that seaplanes might more easily be handled by Patrol Squadron Three-M, the detachment stationed there. During the first week approximately one thousand cubic feet of sand and coral were dredged from the inside of the cofferdam erected around the end of the runway. An effort was made to build the ramp by pouring concrete, but the portion under water failed to harden successfully and the idea was abandoned. The ramp was built by casting concrete blocks on dry land and sliding them into place under water. Rocks were transported by truck and lighters to the south side of the channel, where they were built into a wall to stop the flow of current into the newly-dredged channel.

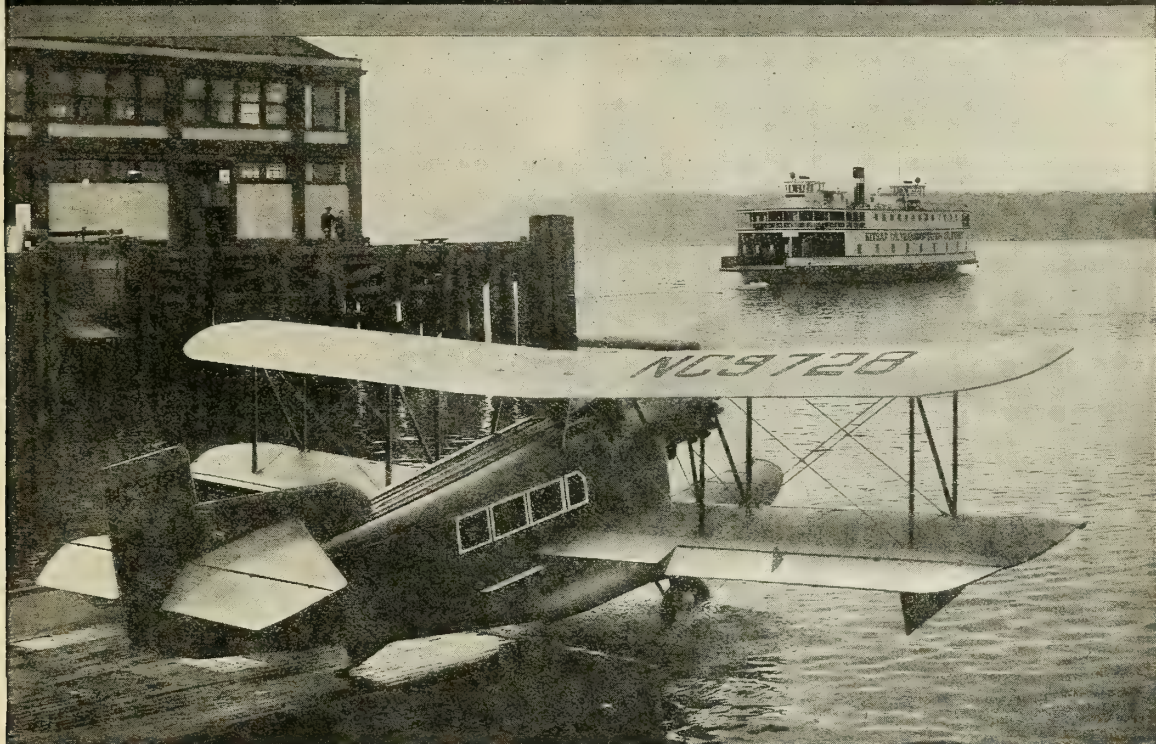
### Medals for Mackay Trophy Winners

FORMER winners of the Mackay trophy, annually awarded to the Army Air Corps officer or officers making the most meritorious flight of the year, will receive gold medals bearing a replica of the medal and the name of the winner, the War Department recently announced. The Mackay trophy carries the names of the winners of the trophy for each year engraved thereon. The trophy itself remains in the office of the Chief of the Air Corps.

Prior to this year the recipients of the trophy had nothing to show that they had been the winners excepting the fact of their names being engraved on the trophy. This year Mr. Mackay has provided each of the former winners, from the year 1912 to 1927, with a gold medal, one side of which carries the replica of the Mackay trophy, the opposite side carrying the name of the winner of the trophy for the year in question.



# KEYSTONE-LOENING AMPHIBIAN "AIR YACHT"



## 14,000 PASSENGERS IN 90 DAYS WITH TWO "AIR YACHTS"

Within 90 days after its inception on June 15th, 1929, 2330 trips were completed on regular schedule on the Seattle-to-Bremerton run of the Gorst Air Transport Company. A total of over 14,000 passengers was carried during the period with an average of 80% full load per trip. Incredible as it may seem, only two Keystone-Loening Amphibian Air Yachts were used for the entire operation, each ship sometimes making two trips per hour all day.

This miniature route is but 15 air miles across the winding, island-dotted course of lower Puget Sound. The flight takes but 12 minutes, saving the passenger one hour and a quarter as well as giving him a scenic flight at the cost of an ordinary hop.

This outstanding example of successful air transportation on what is probably the shortest regular air line in the world, is interesting and enlightening. It is an operation that can be duplicated with equal profit in many other localities when operators realize fully the advantages of the amphibian type of plane and the economies and rugged reliability of the world's foremost amphibian—the Keystone-Loening Amphibian Air Yacht. Particulars on request.

6 to 8 passengers : 525 H. P. : 100 M. P. H. Cruising : \$27,900



The scene above shows the Keystone-Loening Air Yacht on the Seattle-to-Bremerton route of the Gorst Air Transport Company, entering the water at the Seattle Terminal.

**KEYSTONE AIRCRAFT CORPORATION**  
SALES DEPT.—31ST STREET AND EAST RIVER, NEW YORK  
PLANTS—BRISTOL, PENNSYLVANIA, AND NEW YORK CITY



## URGES EXTENSION OF 5-YEAR PROGRAM

**A**N extension of the Army and Navy five-year aircraft building program to include the establishment of a unit of bombing planes in the Pacific northwest and another in the San Francisco Bay district, will be asked of Congress by Representative W. Frank James of Michigan, chairman of the military affairs committee of the lower house, according to a recent announcement of Mr. James. The plans for the new aerial defense of the Pacific Coast, as projected by Mr. James, call for two bombing groups numbering up to 50 planes each.

Mr. James, piloted by Capt. H. A. Dinger, has flown 52,500 miles in 535 hours during the past two years inspecting military and naval defenses and facilities throughout the United States and its territories.

## DIRIGIBLE-PLANE HOOK-UP TESTS

**T**HE Navy dirigible, *Los Angeles*, under the command of Lieutenant Commander Herbert Wiley, successfully accomplished experiments in contacting with an army bi-plane piloted by Lieut. J. Gordon over the Naval Air Station at Lakehurst the latter part of August, and over the National Air Races at Cleveland. The *Los Angeles* was equipped with a trapeze constructed of the same material that makes up the framework of the ship. The plane was equipped with a large hook atop the wing which fastened automatically to the cross-bar hanging below the dirigible while in flight. In making the hook-on the flier in the plane manipulated a lever which sent out a hook from the top of the plane's upper wing. This was caught on the rigid trapeze suspended under the *Los Angeles* about midships. The aviator could then release the hook. On the demonstration made over the National Air Races, Lieut. C. M. Bolster transferred from the dirigible to the plane.

Naval aeronautic officials commented favorably on the success of the maneuver, stating that it would increase the military and commercial value of airships. The results of the experiments will be considered in planning the two new Navy dirigibles to be constructed by the Goodyear-Zeppelin Company at Akron, Ohio.

**T**HE U. S. Naval Air Station on Lake Washington, Seattle, Wash., will have a \$400,000 paved highway from the city to the station. Paved runways within the station will be constructed with station labor.



U. S. Army Air Corp. Photo

Pursuit planes from Selfridge Field taking off at the National Air Races

The station comprises 411 acres situated at Sand Point on Lake Washington, a lake 17 miles long. The station is perfectly located for a seaplane base, having a well protected harbor free from tidal influences and salt water effects. Excavation and filling will be required for landplane use. The original field consisted of a clearing 325 feet wide by 1700 feet long. Within the last year it has been increased to 900 feet by 2300 feet, and by the end of the summer it will be further lengthened to 3000 feet. The permanent industrial barracks buildings are being constructed as rapidly as money is available. The entire station will be finished and ready for occupancy in 1931.

## AIR CORPS PRIMARY TRAINING CLASSES START OCTOBER 15

**T**WO hundred and sixty-eight students, civilian college graduates and enlisted men of the army, will start training Oct. 15 at the Army Air Corps' two primary aviation training schools at Brooks Field, Texas, and March Field, California. Officers from various branches of the army detailed to the Air Corps number 129. Of these, eighty-one are assigned to Brooks Field and forty-eight to March Field. All assigned to March Field are members of the June graduating class at West Point, fifty-eight of the graduates being assigned to Brooks Field. The others assigned to the two fields include 124 college graduates from civil life, forty-eight being assigned to Brooks Field and seventy-six to March Field; as well as fifteen enlisted men, twelve from Air Corps organizations and three from other branches of the service.

The list of eligible candidates for appointment from civil life numbered more than 600. Lack of accommodations at the two schools made it necessary to limit the appointments.

The course at the primary flying schools is of eight months' duration, followed by a four months' course at the advanced flying school at Kelly Field, Texas. Cadets and enlisted men successfully completing the

year's course are commissioned as Second Lieutenants in the Air Corps Reserve.

## ZMC-2 INSURED FOR NAVY TESTS

**P**ILOTED by Captain William Kepner the ZMC-2, first successful all-metal dirigible, arrived September 12 at Lakehurst, N. J., on her delivery flight to the Navy from Grosse Ile Airport, Detroit, where she was first test-flown last month. She was housed with the metal and fabric *Los Angeles* in the giant hangar at the naval air station.

The dirigible was accepted by the Navy for trial flights on September 17 after the ship, with an evaluation of \$300,000, was insured for the entire series of trial flights. Barber and Baldwin of New York, underwriting agents for the Aero Insurance Company and the Aero Indemnity Company, upon advice of the Aero Engineering and Advisory Service, insured it for the full amount of its value under a comprehensive policy protecting against fire, accidental damage, damage to the craft itself, public liability and property damage. The policy was made in favor of the Detroit Aircraft Corporation and, or, the Aircraft Development Company and, or, the United States Navy, covering all test flights during two months, including delivery.

## Revised Navigation Tables Available

**H.** O. PUBLICATION No. 208, Navigation Tables for Mariners and Aviators, has been revised and is available for distribution, the Navy Department announced recently. This book differs from the original edition in having all noted errors in the tables corrected. In conformity with the nautical definition of hour angle, the method has been altered to a uniform system of measuring all hour angles from the upper branch of the meridian westward through 360 degrees. Rules are now clearly stated, so that when the hour angle falls in any quadrant, no confusion will arise.

## Tampa Army and Navy Club

**T**HE Army and Navy Club at Tampa, Florida, has quarters in the Tampa Terrace Hotel to which all officers of the services are invited when in the vicinity. The organization was founded in 1927 by Major Philip G. Murphy to provide an organization in which former officers could continue their contacts with the military and naval forces, find an outlet for their interest in the national defense, and have an opportunity of assisting in the development and training of the younger officers who are succeeding them.



U. S. Army Air Corp. Photo

A trio of Navy High Hats of Fighting Plane Squadron One at Cleveland Airport



## St. Louis

"THE Natural  
CENTER of  
AVIATION"

## St. Louis

"STRATEGIC  
LOCATION"

## St. Louis

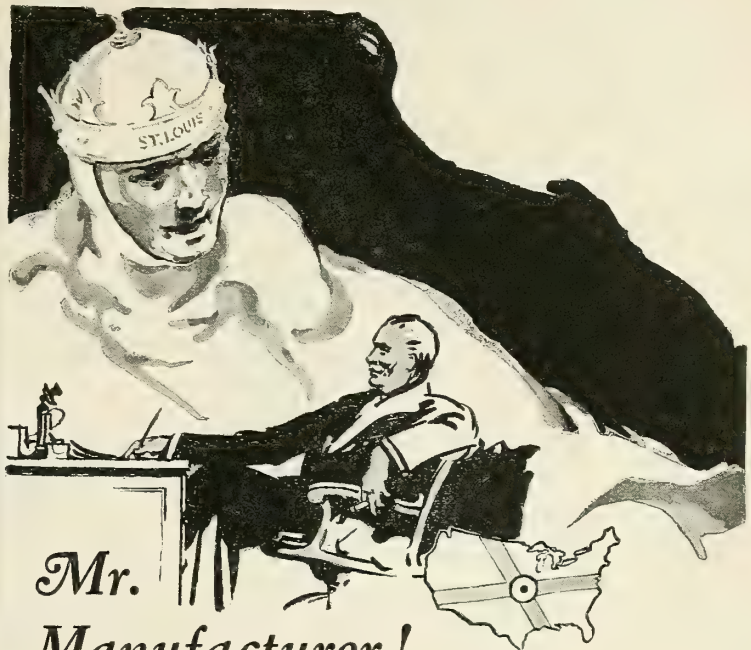
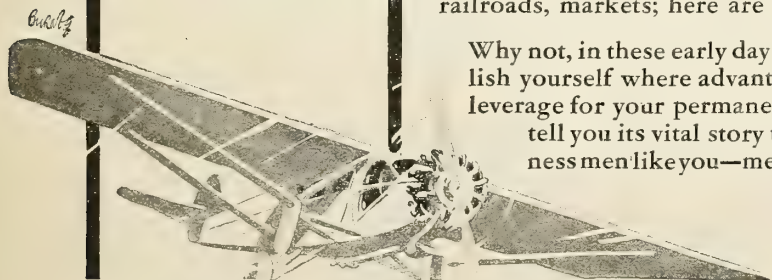
"—the SHIPS and the  
ENGINES and the  
MEN to run them, too"

## St. Louis

"CROSSROADS  
OF THE AIR"

## AVIATION

is headed towards  
ST. LOUIS



## Mr. Manufacturer!

*—why don't you, too, take advantage  
of St. Louis' superior location?*

Surely you must have noticed the unusual development of Aviation's progress in the St. Louis district. You have seen, here, many of Aviation's outstanding accomplishments; its new achievements; the concentration of great organizations... But has the possible personal application ever occurred to you?

Picture your own factory—your business—in this big air-minded city! Here, in the friendly, keenly interested atmosphere which sponsored Lindbergh's Flight! Surrounded by other manufacturers in your own and allied lines! Served by the endless advantages of a major manufacturing city! Spotted at the natural Center of Aviation—the Crossroads of the Air!

Spread around you here are thousands of miles of level flying country. Nearby are fifty million people. Aloft are air conditions that make possible World's Endurance Records; that, more practically, make Aviation a sure and certain phase of Transportation. Here is finance unlimited; here are materials, men, power, railroads, markets; here are ideal manufacturing conditions.

Why not, in these early days of this unfolding industry, establish yourself where advantages of location apply invaluable leverage for your permanent success? Why not let St. Louis tell you its vital story through the mouths of other business men like you—men who came, and saw, and profited.

*Let us acquaint you with them, confidentially and without obligation!*

INDUSTRIAL BUREAU OF THE INDUSTRIAL CLUB OF ST. LOUIS

Dept. A-3 . . . 511 Locust Street . . . St. Louis, Mo.



# AIRPORT AND AIRWAY

*News of airlines, airports, and airways; radio, lighting and other auxiliary services*

"There Ought to Be a Law . . ."

**A**VIATION seems to be a popular subject in the various state capitals this season. The Aeronautical Chamber of Commerce, which is trying to direct the flood of legislation into more or less coherent channels, reports that there were 250 new bills introduced in the various state legislatures within the last twelve months, and that 106 of them became laws. Sixty-five were defeated, and seventy-nine remain to be dealt with at some future time.

"Nevada and Louisiana," continues the report, "were the only states with legislatures in session which did not take up aircraft legislation. . . . That the separate and individual activities of forty-one jurisdictions by forty-one separate legislative groups did not produce a more chaotic condition is something worthy of remark."

Interpreted for the benefit of some of Cy Caldwell's constituents, this means that if they could have produced a more "chaotic condition," they probably would have. The fact that some order prevails is certainly "worthy of remark," and constitutes a vivid testimonial to the efforts of the Aeronautical Chamber of Commerce. In spite of heroic efforts by that body, however, here are a few of these "separate and individual activities" as given in the report:

Seventy-one bills were introduced by the states for the regulation or licensing of aircraft or pilots.

There were eighty-four general acts and thirty-five special acts relating to airports introduced.

A bill in Ohio providing for a refund on gasoline taxes paid by aircraft owners was vetoed by the governor.

The neighboring state of Michigan, however, adopted the idea and clapped a state tax on all aviation gasoline.

California included airplanes in quarantine regulations against agricultural pests. This may sound strange in the East, but in the Golden State whole districts are quarantined for months at a time, and all vehicles entering and leaving must be inspected and frequently are fumigated or otherwise disinfected.

Grover Whalen, New York's much-photographed police commissioner, told reporters that he had about decided to organize

By  
**Kent Sagendorph**

a squadron of flying traffic cops, who, at a cost of several hundred thousands of dollars per year, would devise some sort of aerial stop-and-go signals to keep pilots away from certain areas; notably the Coney Island beaches.

Elvin N. Edwards, prosecuting attorney of Nassau County, called a council of pilots from the adjoining Long Island fields for the purpose of submitting the first draft of a "proposed state law" for the regulation of aircraft. Being a diplomat, the astute attorney did not say anything about "agricultural pests."

This tendency on the part of state legislatures to meddle with the commercial operation of aircraft seems particularly regrettable. These bodies can do the cause of aviation within the borders of their states a world of good by special bills authorizing airports and appropriations for their maintenance or by adopting the Uniform State Law, patterned after the example of the Air Commerce Act of 1926. But interfering with the normal operation of organized flying indicates a brand of judgment akin to that of the famed Indiana session which passed a law changing the relation of the diameter to the circumference of a circle.

## Notes on Cleveland's Dusty Airport

**F**LYING toward Cleveland from Buffalo at an altitude of about 2,000 feet, Arthur Ransom and I observed a curious cloud formation ahead of us just before we picked up the City of Cleveland. Without hesitation, Ransom headed straight for the dust cloud and landed right in the middle of it. It proved to be Cleveland Airport. I am told that General Foulois and his aide, Lt. C. Caldwell (not Cy), had a similar experience.

At the time we saw this phenomenon, we estimated that it extended over the field to a height of about 1,000 feet. Later reports showed that it was considerably higher than this, and thick enough to interfere seriously with visibility. With all the spectacular stunt and formation flying as well as scores

of demonstration and test flights taking place all day long, it is difficult to account for the complete lack of collisions or other accidents resulting from this dust condition. A dust problem as bad as that one should not occur again at any national air meet.

## Syracuse Airport Solves Lighting Problem

**O**NE of the ways for an enterprising community to secure adequate beacons, floodlights, boundary and obstruction lights for its airport is to induce one of the country's largest manufacturers of airport lighting equipment to locate in the vicinity. An example of this fortunate circumstance is to be found at Syracuse, N. Y., where the Crouse-Hinds Company has installed every sort of airport lighting device at the municipal airport for testing purposes.

Syracuse has several other advantages at its airport besides the superabundance of lights. The best light lunches in that part of the state await the flier at two nearby stands; the Curtiss Flying Service maintains a well-stocked supply station there, equipped to service all kinds of planes and engines; and Field Manager Kincaid sends a boy out to your plane to get your name and that of your passenger as soon as your wheels stop rolling. Next time you stop there you will find that everyone on the field knows you.

The field is wide, level, well-kept—and dustless.

## AIRPORT AND AIRWAY DEVELOPMENTS

### Central Airport Dedicated at Camden

**T**HE U. S. S. *Los Angeles*, full-page advertising in the *Saturday Evening Post* and speeches by Clarence M. Young and other dignitaries marked the dedication of the new Central Airport of Camden, N. J., which replaces the old municipal airport in the fortieth ward as Philadelphia's principal airport.

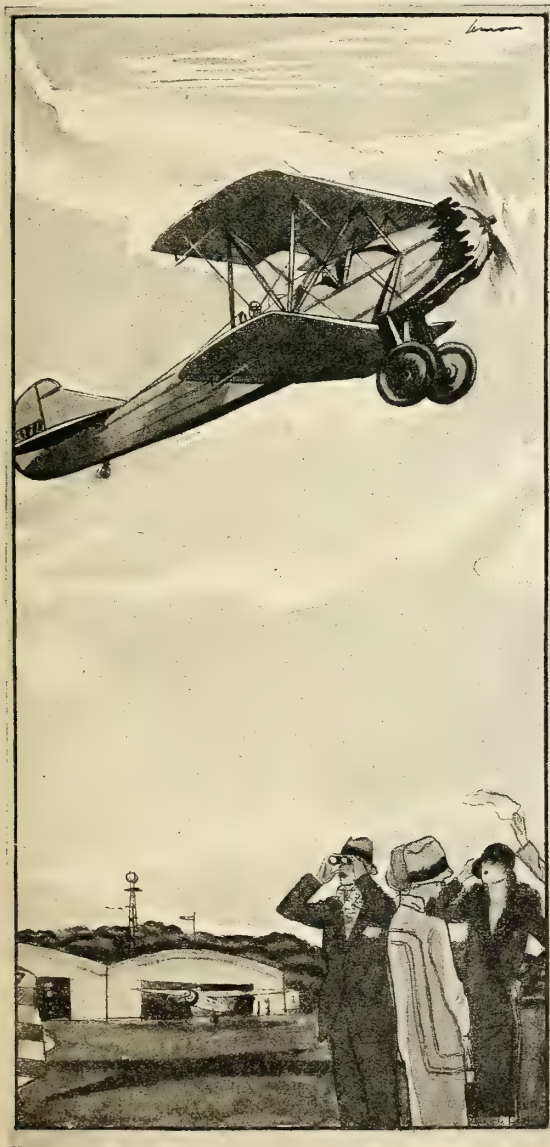
Sentiment in Philadelphia does not favor the change, according to contemporary reports. Although the new airport is only fifteen minutes from the heart of the city by motor car, Philadelphians believe that Camden should not have been given such prominence in the aviation activities of the

(Continued on next page)



A line of new hangars to be constructed as a part of the development program at Roosevelt Field, L. I., N. Y.

# THE WHIRLWIND J-6 AND ITS DEBUT AT CLEVELAND



THE Cleveland show brought thousands of men nearer to a seat in an airplane . . . it brought thousands of hands a little closer to their place upon the stick.

For the new planes, the new engines, and the new records earned their headlines and their cheers. The new progress of aviation seeped by radio, by eyesight, by printing press and voice to all quarters of the land.

Brilliant among the performances were those of the new Wright J-6's. Their power, their speed, their ease of handling announced to all who flew them that another great step has been made in the development of air-cooled engines, and the new J-6 engines have surpassed the famous old J-5, with which honored hero so many famous names have been inseparable!

Look to Wright, then, for more records and more performance! For the J-6 series gives plane designers new horizons to march on—and pilots more power back of the gun!

The motor is still the heart of the airplane. And the accomplishments of the J-6 series . . . even more than daring deeds and new records . . . bring nearer the day when men will take their ways upon the air in calmness, speed, and surety!



**WRIGHT**  
AERONAUTICAL CORPORATION  
PATERSON, NEW JERSEY







One of the new buildings on the Los Angeles field of the Aero Corporation of Calif.

(Continued from preceding page)

Philadelphia district. The new port will henceforth be used as the Philadelphia air mail field.

Elton J. Layton, clerk of the House of Representatives in Washington, acted as Program Director during the dedication ceremony.

#### New Marker on Boston-New York Route

**P**ILOTS flying over the Boston-New York route will appreciate the excellent markers recently installed on the roofs of the Russell Manufacturing Co., Middletown, Conn., manufacturer of Rusco Aero Products.

There is a standard Government marker 150 by 15 feet on one roof and another smaller sign reading "Home of Rusco Products" on another. It is a particularly good location for a prominent marker, being on the direct mail and passenger routes used by Colonial and many private planes.

#### "Tri-Hour" Radio Weather Reports Promised

**T**HE three-hour weather report summaries prepared by the Weather Bureau from data collected in its "secondary net" will soon be broadcast from all Department of Commerce radio stations. This "secondary net" is composed of stations 150 to 200 miles away from the transcontinental airway, and about equal distances apart. The weather information is collected every three hours from all stations comprising the net, beginning at 2 o'clock in the morning. The Weather Bureau stated that the information would be broadcast within thirty minutes after the actual observation had been made.

#### Ames Field, Philipsburg, Pa., Dedicated

**A**MES FIELD, Philipsburg, Pa., named in honor of the late Charles Ames, prominent air mail pilot who was killed when his plane crashed in a fog in 1925, was dedicated on September 7th with appropriate ceremonies.

The airport is located midway between New York and Cleveland, on the transcontinental route. The tract consists of approximately 175 acres, 42 of which have been in use by the Government as an emergency field in air mail operations.

There are a 2,000,000 candlepower beacon, boundary lights and illuminated wind cones.

The airport has the regulation white circle, airways directional arrow and hangar space for six planes. John B. Rumberger is in charge of operations.

#### Aero Corp. of California Erects New Buildings on Los Angeles Airport

**A**N extensive building program, consisting of a new hangar, stock room, machine shop and motor test building, has been nearly completed on the Los Angeles field of the Aero Corporation of California. The four buildings are all of fireproof construction, having 21,688 square feet of concrete flooring, asbestos roofing and corrugated iron sidings. The motor test building is divided into compartments, with steel motor test stands and exhaust pipes running outside. All controls lead into a central control room, provided with windows from which the operation of all motors may be observed.

#### Roosevelt Field Development Program

**I**MPROVEMENTS costing more than \$1,000,000 will be started at Roosevelt Field immediately, according to Mr. Seth Low, president of Roosevelt Field, Inc. In addition to the eight new buildings of steel and concrete which are planned for the new section, the historic airport will have perhaps the longest enclosed runway in the country; a graded and hard-surfaced clear stretch of 7,900 feet. A new lighting system has been installed, consisting of floodlights and beacons totaling more than 66,000,000 candlepower.

The unusual length of the runway was made possible by combining the present Roosevelt Field No. 2 (formerly Curtiss Field) with Old Roosevelt Field, where Lindbergh, Byrd and Chamberlin made their transatlantic take-offs. The treacherous gully between the two fields, which crushed the hopes of Rene Fonck, has been eliminated and the entire surface of the dual airport is being re-graded. The eight new hangars are being constructed by Stone and Webster from designs by Kenneth Franzheim, architect. The new buildings will provide 100,000 square feet of hangar space, office, shop and exposition facilities. Most of the space in these buildings, it was announced, has already been leased to manufacturers and dealers; some of whom already have space in the present structures on the field and others of whom will be newcomers to the Eastern markets.

#### Boston Hangar Space Rates Announced

**I**N line with the editorial comment in these pages last month, it might be interesting to observe that the Boston airport has announced a price list for hangar rentals and service charges applying to both permanent and transient airplanes. Monthly and overnight charges for the following planes indicate the basis on which the rates are fixed:

Type of Airplane	Per Month	Per Night
Great Lakes Trainer..	\$30	\$2.50
Stearman Biplane ....	\$35	\$3.00
Bellanca Monoplane ..	\$40	\$3.50
Loening Amphibion ..	\$60	\$5.00
Ford and Fokker Trimotors .....	\$75	\$6.00

Service charges are \$1.50 per hour. Airplane gasoline is 30c. per gallon and oil 30c. per quart.

If a few more airports would publish rates for permanent and transient guests, the Airport and Airway Section could provide a very welcome service to pilots all over the country. From the above list of charges, a prospective visitor to the Boston airport can approximate the amount of his bill for a stay of any duration. The natural result is that business at the Boston airport will pick up—the policy of one price in plain figures has been proved a money-maker in so many other businesses that the airports of the country will find it profitable to adopt it for their own use.

#### Lighted Airways Cover 10,180 Miles

**A**PPROXIMATELY 10,180 miles of lighted airways are now in operation throughout the United States, with an additional 2,065 miles under construction and expected to be completed in the near future, according to Clarence M. Young, Director of Aeronautics, Department of Commerce.

In addition, 263 intermediate fields, 1,406 airway beacons, 164 weather reporting stations, 27 communications stations and 7 radio range beacons have been placed in operation as aids to air navigation. There are ten new airways under construction, including routes from New York to Montreal, Cleveland to Albany, Detroit to Kalamazoo, Chicago to Atlanta, Milwaukee to Green Bay, St. Louis to Evansville, Salt Lake City to Pasco, Columbus to St. Louis, Los Angeles to Albuquerque and Seattle to San Francisco.

#### Business Increases at Mills Field

**M**ILLS FIELD, the municipal airport of San Francisco, showed a big increase in all classes of airport business during the past month, according to Milo F. Kent, supervisor. There were 2,576 flights and landings with 3,726 passengers during the past month, as against 2,236 flights and landings with 2,889 passengers in July; a gain of approximately 15 per cent in flights and 25 per cent in passengers. Revenue likewise increased in proportion, and the board of supervisors appropriated \$76,000 for urgent improvements. The sum will be used to provide completion of the drainage system, resurfacing in front of the hangars, additional floodlights and more office space. The

(Continued on next page)

# Do you KNOW

1. *How to design a hangar?*
2. *What materials to use for roof and sidewalls?*
3. *How best to ventilate it, and how to daylight it?*
4. *How to prevent corrosion?*

These hangars of the United States Air Service at Lowry Field, Denver, have roofs and sidewalls of Robertson Protected Metal—a light, economical, easily-erected material that will not rust or corrode, needs no paint and involves no other maintenance expense.



# ROBERTSON

*Has the Experience*

**I**N WORKING with hangars—nothing succeeds like experience. But it has to be experience with the specific problems of hangars. Experience in other fields of construction does not do you much good here.

Men, inexperienced in this field, have put up hangars of unprotected metal which literally melted away in rust in a few years. Then they have put up hangars of "heavy construction" that cost so much money it will take 30 or 40 years to write them off the books.

Other men have put up hangars with little regard for the light needed in them . . . and it is almost impossible to work on planes in those hangars except with costly artificial light. Others have

ignored the subject of ventilation . . . and trouble with carbon monoxide has resulted.

There are a lot of ticklish problems involved . . . and no one can possibly foresee them unless he has had the experience.

The H. H. Robertson Company DOES have the experience. It has been working with hangars since war days in France. It has worked on hangars all over the world . . . for armies, navies, for municipalities . . . for private companies and individuals. All this experience is at your command. Bring your airport problems to the Robertson engineers. Their suggestions will not cost you anything, and will not obligate you.

H. H. ROBERTSON CO. · PITTSBURGH



(Continued from preceding page)

present hangar space of 40,000 square feet is taxed to capacity.

### Interstate Shows One Hundred Per Cent Summer Record

**PILOTS** on the air mail runs of the Interstate Air Lines, Inc., operating the Chicago-Atlanta air mail and passenger service, and a spur line between Evansville, Ind., and St. Louis, Mo., are piling up an enviable record for 100 per cent completion of all scheduled flights.

For thirteen weeks, to August 10th, ships of the Interstate fleet had not missed completing their runs daily. Stops along the Chicago-Atlanta route are made at Terre Haute, Evansville, Nashville and Chattanooga. No stops are made between Evansville and St. Louis.

### Logan Field Illuminated for Night Flying

**LOGAN FIELD**, Baltimore air mail stop, is illuminated now for night flying. The lighting equipment includes seven 3,000-watt floodlights, arranged around the base of a light control tower. There are also boundary and obstruction lights and a powerful rotating beacon. The beacon and blinker lights are in operation all night. There is always a city employee in the control tower, and upon signal to him by approaching airmen, the floodlights are turned on. As a permanent installation, there are twenty-eight boundary lights, forty-two obstruction lights and fourteen hangar floodlights.

### T. A. T. Flying Service Improving Field

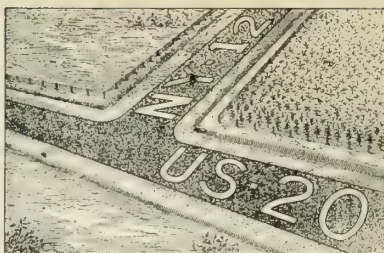
**WORD** has lately been received that the T.A.T. Flying Service, Inc., a subsidiary of the Southern Air Transport, is in the midst of a \$10,000 improvement program at Menefee Airport, New Orleans, La. Runways will be lengthened to about 3,000 feet and provided with tile drainage and crushed shell surfacing. Short-wave radio equipment is being installed, completing the hook-up with six other branches of the Southern Air Transport net. A new administration building and a machine shop, together with a test room, are being constructed.

### NEW COMPANIES AND MERGERS

**I**N the August issue of AERO DIGEST appeared a paragraph to the effect that Western Air Express had purchased the West Coast Air Transport Corporation.

The issue had not been off the press very many days before we received a courteous note from Bradford M. Melvin, vice president of West Coast Air Transport, saying that his company was the buyer, not the one which was bought. A corrected statement follows:

"West Coast Air Transport Corporation, a Delaware corporation, of which Harris M. Hansue is president, has acquired the assets of the Western Air Transport Company, an Oregon corporation. The new company will continue to operate a passenger transport service between San Fran-



Air markings of the type recommended for Federal and State highways

cisco and Seattle. At the former point, these lines connect with Western Air Express services between San Francisco, Los Angeles and Salt Lake City."

### California Association Changes Name

**T**HE California Aircraft Operators' Association, with headquarters in Los Angeles, has changed its name to the California Aircraft Industry Association. Its functions include a representation in the affairs of air transport companies, owners and operators of airports, sales companies, manufacturers accessory dealers and schools.

### Argentine-to-Chile Airline Launched

**A**N American company, the name of which has not been disclosed, has opened a bi-weekly service carrying passengers and mail between Buenos Aires, Argentine, and Santiago, Chile. Two trips a week are being made in both directions, using Ford trimotor equipment.

During the last eight years, three European companies have attempted to maintain a bi-weekly service between Buenos Aires and Montevideo, across the River Platt. They failed, despite government subsidies and mail contracts. The American company, with larger equipment, carrying eight passengers and making two trips daily across this route, cannot accommodate all the passengers applying for tickets, and has cabled the United States for an additional plane for this service. The round trip fare is \$3.50 higher than boat fare, which trip takes all night.

This company is now establishing the trans-Andean service to Santiago. The time is ten and a half hours, as compared to the rail time of 36 hours, and the fare is \$38 higher, or about 35 per cent greater than rail fare. Lunch is served aboard, this being the first instance in which meals have been served on a plane in South America. Among the passengers on the inaugural trip was Eduardo Bradley, who will fly over the Chilean mail route to the United States, where he will fly the Argentine Aero Club's balloon in the Gordon Bennett races in St. Louis.

### THE PASSENGER LINES

#### Universal Carries 585 Passengers During July

**P**LANES on the air divisions of the coast-to-coast air-rail service operated by the Universal Aviation Corporation in conjunction with the New York

Central and Santa Fe Railroads carried 585 passengers during July; flew 63,714 miles with a record of 100 per cent of scheduled trips completed, and did not miss a single train connection, Paul Goldsborough, vice president in charge of operations, announced recently at Universal headquarters.

The Universal coast-to-coast journey calls for only one day of flying—between Cleveland and Garden City, Kansas, via Chicago and Kansas City, but brings the Atlantic and Pacific within two business days of each other. The Fokker trimotored transports used on the line averaged 122.5 miles per hour, and the average flying time over the 1,087-mile route was 8 hours, 58 minutes, eastbound, and 9 hours, 51 minutes, westbound.

Nominal reductions in fares for the coast-to-coast trip were announced simultaneously with the traffic report. The new tariff is \$223.51 as compared with the former rate of \$233.76; a reduction of approximately ten dollars. Similar reductions have been made affecting Denver, Pueblo, Colorado Springs and similar points. The fare between Cleveland and Chicago remains at the old rate of \$37.50.

### First Air Cruise in America Announced

**A**T a conference held recently in New York attended by representatives of leading tourist agencies, American Express, prominent railroads covering the Eastern and Southern sections of the nation, and Pan American Airways, Inc., plans were announced for an air-rail cruise throughout the Eastern part of the United States and four countries in the West Indies.

The schedule as adopted by the conference provides for rail transportation to Miami from any point east of the Mississippi River. At this point, the traveler boards a Pan American airliner and is carried to Havana, Camaguey and Santiago, Cuba; Port au Prince, Haiti; Santo Domingo in the Dominican Republic; and San Juan, Porto Rico. Stop-overs are allowed at all points. From San Juan, the tourist returns to New York by steamer, and thence to his point of original departure by train.

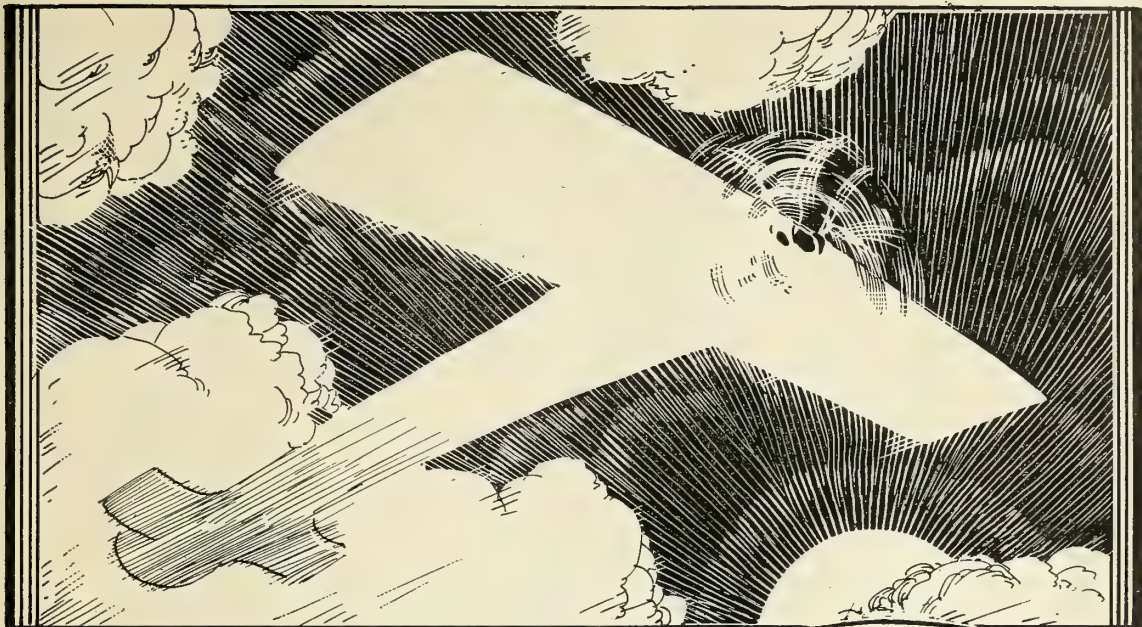
The pioneer air tourists will be carried in Fokker trimotor transports, equipped with radio and carrying a crew of four. Preliminary plans call for a schedule of twenty days for the cruise, at an all-expense fare of \$890, which includes all transportation, hotels, meals, motor tours and incidental costs.

### Traffic Increase on S. A. T. Follows Fare Reduction

**R**EDUCED air passenger fares, instituted over the Southern Air Transport System August 1st, have brought such an increase in passenger traffic that every weekend hereafter two planes instead of one will be run each way on both the Dallas-El Paso and the Dallas-Brownsville lines. This announcement was made recently by Victor F. Grima, assistant general traffic manager for the S.A.T.

Since the reduction in the fare from 12

(Continued on next page)



Far from the  
Haunts of Man—**ALONE!**

**F**LYING solo—thousands of  
feet in the clouds—something  
happens.

A lucky landing with but minor  
injuries. Then "Tabloid" First-  
Aid to the rescue—assuring safe-  
ty from serious developments.

Better be safe than sorry.

## "TABLOID" — FIRST-AID PRODUCTS

STANDARD EQUIPMENT IN MOST MODERN AERO ACTIVITIES

**BURROUGHS WELLCOME & CO., (U. S. A.) INC.**  
9 & 11 EAST FORTY-FIRST STREET, NEW YORK CITY

*Associated Houses:*

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complete by maintaining a re-  
serve supply of refills."**



"Tabloid" First-Aid (Pocket Kit)

An unique equipment to be carried  
in the pocket—\$1.00.

Order through your Aviation Sup-  
ply House—Insist on "Tabloid"  
First-Aid.

Please send me A. D.  
**"TABLOID" FIRST-AID Booklet**

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Address .....  
Individual's Name .....  
Official Capacity .....



(Continued from preceding page)

to 10 cents a mile, and the introduction of a fare-and-a-half round trip excursion rate, passenger traffic on the lines has more than doubled.

#### Colonial Breaks Own Traffic Record

A NEW record for the entire Colonial system was set up during the last week in August when a total of 378 persons were carried over Colonial lines; 242 between New York and Boston, 30 between New York and Montreal, and 106 between Buffalo and Toronto. Sumner Sewall, traffic manager of the system, attributes the heavy travel figures to the Labor Day exodus from the several cities. Early indications pointed to another peak-load the following week because of the returning vacationists. Increased vacationist travel over the Labor Day week-end made it necessary for the company to operate extra sections on Friday and Monday to take care of reservations.

#### Scenic Airways Reports Increased Patronage

ACCORDING to recent advices from W. G. Herron, president of Scenic Airways, Inc., operating Ford trimotors over the Grand Canyon districts, more than 2,000 persons have been carried over the gorge on sightseeing trips in his ships since March 1st, 1929. From fifty to eighty tourists have made the flight daily.

The company has flown a half million miles without a single mechanical forced landing. Not a single person has been injured in Scenic Airways planes. A boy was slightly hurt when a hangar crew rolled a plane wheel over his arm.

#### Mexico City-New York Line Offers 50-Hour Schedule

ANNOUNCEMENT of the first international air-rail hook-up to Mexico was made recently by Robert J. Smith, traffic manager of the Southern Air Transport, which will carry passengers by air over the longest leg of the proposed route. Other companies involved are: Universal Air Lines, Mexican Aviation Company, M.K. & T.R.R. and the New York Central.

Coming north, passengers leave Mexico City via Mexican Aviation Company plane to Brownsville, Tex., thence by Southern Air Transport plane to Dallas. There the passenger boards a M.K. & T. sleeper, arriving the next morning at Tulsa, Oklahoma,

where he boards another airliner for Kansas City. A transfer is made at Kansas City to a Universal plane, which flies to Cleveland, and the route is thence by New York Central to New York.

The 50-hour schedule applies only to the northbound trip. Southbound, the schedule requires a trifle more than 60 hours, because of established train schedules which cannot be altered.

#### Pan American Passenger Traffic Heavy

PASSENGER service on the Pan American Airways, which operates between the United States, West Indies, Mexico, Central and South America, is proving popular, according to traffic officials of the line, who report that 6,824 passengers have been flown over the line during the first six months of operation.

The Pan American Airways operates a fleet of Fokker F-10 trimotored transports equipped with radio, and carrying a steward and two pilots.

#### Tulsa-Oklahoma City Fares Reduced

THE Braniff-Universal lines have announced two new fare reductions. The fare between Tulsa and Oklahoma City has been cut to \$9, and from Oklahoma City to Wichita Falls, Texas, a reduction to \$10 has been made. Increased business is the reason given as making the reductions possible. The fare between Oklahoma City and Wichita Falls is now \$1.51 more than the railroad fare. By the train the trip between the two cities requires twelve hours, whereas the plane makes the flight in about one hour.

#### Standard Airlines Using Fokker Trimotors

INCREASE in business on the Standard Airlines resulted in the company's decision to operate Fokker trimotored transports in place of the single-motored equipment used until recently. Coincident with the company's announcement of a 25 per cent traffic increase during the month of July, and an increase in revenue amounting to 83 per cent over the previous month, elaborate ceremonies were held at various points along the company's "fair weather route," in which the new Fokkers were dedicated by popular society girls representing the districts. Governor Phillips of Arizona was the chief speaker at the Phoenix "Sky Harbor" airport, dedicating

three of the new trimotors, which were christened the *Californian*, the *Arizonan* and the *Texan*.

#### REGULATING AIR TRAVEL

##### Engineering Council Appoints Committee

APPOINTMENT of a committee of communications to study the proposed legislation involving wire and wireless control is announced by the American Engineering Council. The chairman is Edwin F. Wendt, Washington, D. C. Other members are: O. H. Caldwell, New York, Federal Radio Commissioner; Dean Dexter S. Kimball, Cornell University; Frank A. Scott, Cleveland; and Charles B. Hawley, Washington, D. C.

The committee is expected to report at a meeting of the council's administrative board to be held in Washington in October, when the engineering attitude on a variety of public questions will be discussed.

##### Department Urges Highway Marking

THE Aeronautics Branch of the Department of Commerce recently completed its suggested specifications for the air marking of highways, according to Harry H. Blee, chief of the Division of Airports and Aeronautical Information.

The recommendation for this purpose includes marking each Federal and state highway by number or abbreviation of name. The markings are expected to be placed at all intersections and not more than twenty miles apart on straight stretches. Markings are to be ten to thirty feet high, depending on the width of the paving, and are to be painted in yellow paint, with black edging when on concrete.

#### AIR MAIL ACTIVITIES

##### Pasco Line Produces Lowest Air Bid

THE proposed air mail route from Pasco, Wash., to Spokane, Portland and Seattle was advertised some weeks ago, and when bids were opened recently at Washington, the lowest bid in the history of the air mail service was discovered.

The Varney Air Lines, Inc., of San Francisco, operators of the present route from Salt Lake City to Pasco, Wash., offered to carry the mail on these routes for nine cents a pound. The new route will, in reality, be only an extension of the present Varney lines.

Three other bids were received by the Post Office Department. Robert E. Smith of Portland, Oregon, 74 cents a pound; National Parks Airways, Inc., Salt Lake City, 97 cents a pound; Boeing Air Transport, Inc., \$1.19 a pound.

##### "Graf Zeppelin" Carried Heavy Mail Load

THE *Graf Zeppelin*, in addition to its regular load of fuel and passengers, carried over 36,000 pieces of mail around the world, which were unloaded at Lakehurst, N. J., after the successful termination of the flight. This mail was carried in thirteen pouches weighing about 540



Aqua hydraulic fueling system in service at Roosevelt Field, L. I.

(Continued on next page)

# SCHNEIDER TROPHY



*speed*

THE MANUFACTURERS OF THE  
**ROLLS-ROYCE**  
SUPERMARINE

AND

**GLOSTER-NAPIER**  
SEAPLANES

USE AND RECOMMEND

**WAKEFIELD**

**Castrol**  
MOTOR OIL

**C. C. WAKEFIELD & Co., LTD., NEW YORK**



(Continued from preceding page)

pounds. In addition, the *Graf* had on board two unsealed pouches of round-the-world mail for dispatch at Friedrichshafen, the ship's home port.

Besides this, the dirigible carried 2,522 pieces of mail for Los Angeles from Friedrichshafen; 443 pieces for Los Angeles from Lakehurst, and 1,813 pieces for Los Angeles from Tokio.

#### Ralph Reed Appointed Chief Pilot of Stout Air Lines

**R**ALPH A. REED, who has had more than 1,500 flying hours as pilot of tri-motor passenger transport planes, has been appointed chief pilot of the staff of nine pilots of the Stout Air Lines, operators of the Detroit-Cleveland and Detroit-Chicago air lines.

In his new position as chief pilot, Mr. Reed will have charge of pilot's schedules, development of special equipment on the Ford tri-motor planes used on the air lines, and will survey the new routes to be flown over by the passenger planes. Mr. Reed will also select intermediate landing fields on the routes.

#### New Record for August Mail Poundage

**M**AIL transported by air for the month of August established a new record, according to figures made public recently by the Post Office Department. For that month, the total poundage amounted to 698,062, an increase of 59,252 over July. The daily average for August was 23,268 pounds, as against 20,606 pounds for July, an improvement of 2,662 pounds daily.

National Air Transport was the biggest single carrier for the month, with a total of 205,134 pounds, which broke the July record of the same firm by 14,060 pounds and became the first contract air mail route operated by a single company to carry more than 100 tons in any one month. Colonial reported a total of 36,486 pounds of mail, an increase for that company of 3,417 pounds over July.

#### Venezuela Awards Mail Contract

**S**EVENTY per cent of all South American air mail to the United States, estimated at 55,000 pounds per year, will be transported by the planes of the New York, Rio and Buenos Aires Lines by virtue of an exclusive contract just granted to that company by the government of Venezuela for a period of five years.

This company also holds exclusive contracts with the governments of Argentina and Uruguay. The Venezuelan contract states that the company will receive approximately \$6.40 a pound on all air mail carried to the United States; the Argentine and Uruguayan contracts specify \$10 and \$6.40 a pound, respectively.

#### Recent Growth of Air Mail

**T**HE firm of James C. Willson & Co., New York, has prepared a brief summary of air mail statistics covering the period since January 1, 1928, from which the following table has been selected as an indica-



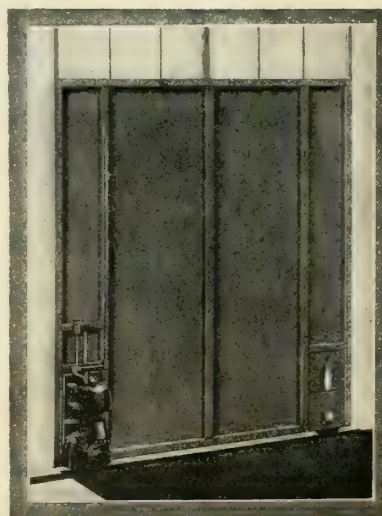
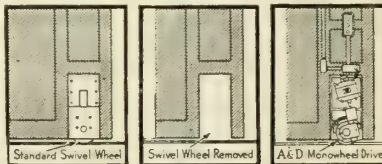
Ralph A. Reed, who was recently made chief pilot of Stout Air Lines

tion of the phenomenal growth in air mail traffic in the last two years:

1928	First quarter	471,600 pounds
	Second quarter	581,400 pounds
	Third quarter	1,057,600 pounds
	Fourth quarter	1,427,200 pounds
1929	First quarter	1,427,400 pounds
	Second quarter	1,689,500 pounds

#### P. O. Dept. Losing on Air Mail

**A**IR MAIL is still being carried at a considerable loss, although an increase in revenue and poundage have resulted from the first year's operation under reduced rates, according to the Post Office Department. Postmaster General Walter F. Brown has reached no decision with regard to an adjustment of rate of pay to contractors, which he has been studying for some time.



Small size Allen & Drew hangar door drive. Above, diagram of the installation

The Department is still studying the costs of operation by contractors, who have furnished information as a basis upon which new rates are to be fixed.

The Department's fiscal policy, financial conditions in the United States next year and a new cost accounting system being devised by the Third Assistant Postmaster General are all under consideration by the Postmaster General in connection with the change in rates.

#### NEW DEVICES AND METHODS

##### Electric Mono-Rail Drive to Operate Hangar Doors

**A** RECENT development in the electrical field for eliminating the push, shove, grunt and perspiration, not to say profanity, connected with the opening of the huge sliding doors of airplane hangars is one which will doubtless be received with acclaim by everyone who has ever performed this arduous duty.

The drive can be applied easily to any sliding door installation. Briefly, it consists of a mono-rail upon which the door is made to slide in either direction by means of a motor and a worm-gear drive. Two sizes are available—one for "smaller" doors up to and including 1,000 square feet in area, and a double wheel and clutch device for operating larger units. Both can be applied for any straight line or round-the-corner types of sliding doors.

Power is conveyed through flexible cables, and operation is controlled by means of push buttons mounted on the door itself or at any convenient point in the hangar or office.

The device is called the "Electric Mono-Rail Locomotive," and is offered by the firm of Allen and Drew, Inc., Cambridge, Mass. The manufacturers state that they can make installations in a very short time without interference with traffic in and out of the hangar.

##### Mines Field Installs Neon Lights

**M**INES FIELD, Los Angeles, has gone in rather heavily for markings of Neon lights to assist the growing number of after-dark fliers. The letters "L" and "A," ten feet high, together with a meridian indicator twenty feet long, help to identify the field and provide bearings. On the tower of the administration building, Neon glow lights outline the tower to both fliers and ground observers, providing not only a marker from the air, but an effective advertisement for the benefit of those who happened to be in that vicinity of an evening.

##### T. A. T. Radio and Teletype Facilities

**C**ONSTANT radio communication between planes on the airlines and ground stations has been provided on the routes of the Transcontinental Air Transport through the system of airways communications laid out by the company. The system complies with the specifications of the Department of Commerce, and, though intended as a company facility, becomes one of the official lanes of

(Continued on next page)



# Vancouver to Mexico at 100 Miles an Hour!—Gas \$22.50



The landing at  
Agua Caliente

1350 miles in 13 hours and 7 minutes—in a stock model Great Lakes Sport Trainer—Tex Rankin at the controls—take off at Vancouver—south over the United States—landing in Agua Caliente, Mexico the same day—no stops—only 75 gallons of gas—that's Performance!

Exact counterparts of this marvelous ship are now being produced in volume—engineered to the highest quality standards.

The Great Lakes Sport Trainer is the outstanding value in the light airplane field. Write for new illustrated booklet and complete details.



Tex as he  
finished  
his record-  
breaking  
flight

Tex is con-  
gratulated  
by the  
Mexican  
chief of  
police



The official  
check up



**GREAT LAKES**  **AIRCRAFT**  
CORPORATION CLEVELAND



(Continued from preceding page)  
communication for the use of all planes flying over this airway.

Radio buildings are erected half a mile from all airports along the line. The operating range of the equipment provides for one or more stations to be within call at all times, and voice equipment is the only medium employed except in very adverse weather, when a switch provides a change from voice to code.

The teletype machines on the system are used for simultaneous communication between all the major stations of the chain. For example, a message typed on the keyboard at Columbus appears instantly on machines at Indianapolis and St. Louis. By request for a through circuit, the message can be made to appear at Kansas City, Wichita and Waynoka. The system was developed to meet the demands for a rapid and continuous means of communication be-

tween the major division points, and will be used to a large extent in disseminating news information, weather reports, plane dispatching, ordering plane movements, transmission of reports, reservation requests and inter-company messages.

#### Aqua Flotation System takes Fuel from Top of Tank

AMONG devices of interest to airports and hangar owners is the means of fueling airplanes from a buried storage tank devised by the Aqua Oil Service, Inc., of New York. Instead of the usual method of draining fuel from the bottom of the tank through gravity outlets and suction pumps, the new method provides means for discharging the fluid from the top of the tank, thereby minimizing the amount of sediment and water which can enter the airplane's fuel tanks.

## ST. PAUL MUNICIPAL AIRPORT

By LYLE F. YOUNGSTROM

UP-TO-DATE cities of tomorrow depend largely upon the foresight which they use today in selecting for their airport a site which will not be outgrown by the rapid advance of aviation. Such airports must be situated so that they will be able to expand in every way, simultaneously with development of commercial aviation; provision must be made for the future requirements of a modern airport.

With this belief in mind, St. Paul officials two years ago undertook a five-year program of development of the St. Paul Municipal Airport, which, when completed, will make it one of the finest ports in America. Recent authorization of purchases insures the city title to all land necessary for the ultimate completion of the program.

St. Paul, the capital of Minnesota, chose for its airport a natural site which is but five minutes (1¼ miles) from the main post-office in the heart of the business section of the city. A paved highway has been completed recently from the landing field into the city. Although only a part of the eventual development, the present airport furnishes an adequate field for commercial

operations at this time and in size is comparable to the average airport.

Francis J. Geng is airport master at St. Paul. Mac Emerson, government meteorologist, is head of the United States Airport Weather Bureau station located at the port. This bureau employs four men and maintains 24-hour forecast service. Weather reports are sent at three-hour intervals to both Omaha and Cleveland, which are headquarters for two areas in the northern section of United States.

Fully equipped for night flying, the airport lighting facilities have been carefully worked out to assist pilots to land safely in foggy weather also. Boundary lights, a \$6,275 floodlight (as well as several smaller floodlights), a beacon, and an illuminated wind indicator have all been installed. There is also a 1,000,000 candlepower flashing beacon on a tower above the Merchants Bank Building, 398 feet above the street level. St. Paul is a scheduled stop on the new night air mail line, which Northwest Airways inaugurated August 1, between the Twin Cities and Chicago.

St. Paul's municipal hangar No. 1, a

modern building of steel construction, is sufficiently large to house tri-motored planes, one of which is stationed there at present. The hangar is 100 feet by 100 feet and was erected at a cost of about \$28,000. It has a 10-ton metal door, 16 feet high and 80 feet wide. This door is operated by a motor and rolls up overhead like an ordinary window shade. It can be completely opened or closed in a few seconds. At one side of the building a small administration office contains a stock room, a machine shop and a fire station. A large parking area adjoining the north roadway provides parking space for approximately 1,000 autos. A second hangar will be completed before winter. Gasoline and oil, as well as the service of licensed mechanics, are available at the field.

Sand taken out of the harbor is being used for filling land recently purchased for enlarging the airport. When this work is finished, St. Paul will be able to accommodate both land and seaplanes. The seaplane base will be adjacent to the land port. St. Paul is one of the few cities in the interior which has natural facilities for both land and seaplanes. A seaplane hangar has already been proposed; and as soon as there is a need for it, the hangar will be built.

The water landing area will be in the form of a triangle, with each side 3,400 feet long.

An ordinance fixing terms, under which land at the port may be leased to various concerns was recently adopted by the city council. Among other things, the ordinance provides for the leasing of a minimum of 7,500 square feet of space to any one concern and a maximum of 75,000 square feet. The rental rates vary from one cent a square foot to two cents a square foot annually.

Rapid progress is being made in the development of the St. Paul port as shown on the accompanying map. The complete plan was drafted under the direction of John W. Kelsey, chief engineer of the department of public works. It is so designed that each additional development will be a step nearer completion of the whole plan without interfering with operations on completed portions. As already stated, the city is insured the immediate title to all land above the double line across the map.

The stippled portion of the map shows the present available landing area including the completed paved all-weather, hard-surfaced runway (black), which is 1,600 feet long and 150 feet wide, with a turning apron of about 600 square feet at the west end. This turning apron also will serve two other runways, yet to be constructed.

The area enclosed by the dotted line is that which will be filled before the end of autumn. As soon as the filling is completed, runways will be laid. The portion shaded by crossed lines will be completed this fall. A wind rose in the upper right hand corner of the map shows directions of prevailing winds.

The portion shaded by crossed lines is expected to be completed and ready for use when the annual Ford Reliability Tour reaches St. Paul. Efforts will be made to pave 1,600 feet of the second runway before winter begins. For the present, to prevent

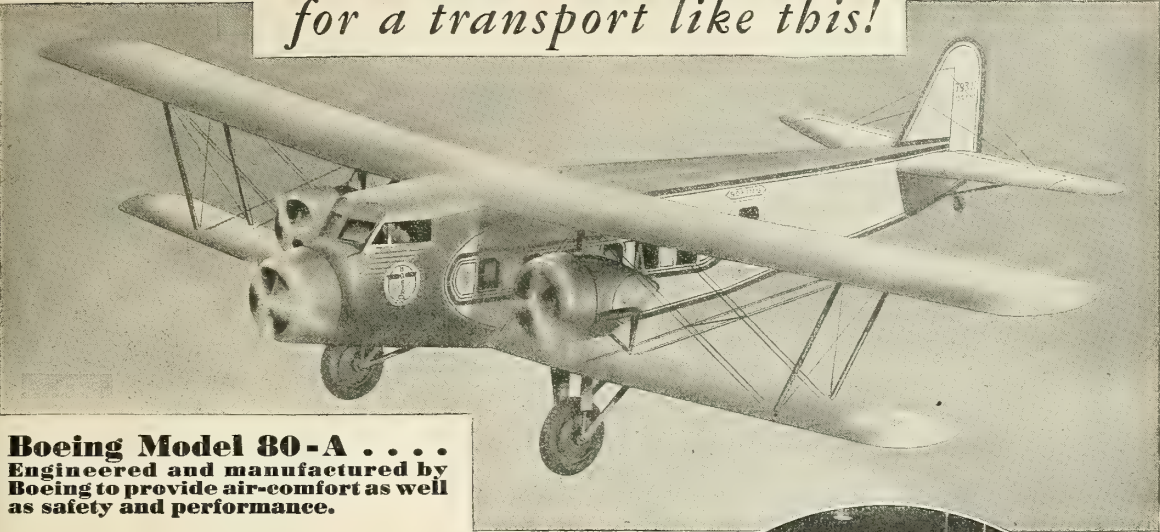


Aerial view of the newly completed runway at the municipal airport of St. Paul

(Continued on next page)



# PASSENGERS ARE WAITING— *for a transport like this!*



**Boeing Model 80-A . . . .**  
**Engineered and manufactured by**  
**Boeing to provide air-comfort as well**  
**as safety and performance.**

**T**HIS new tri-motored biplane incorporates features developed by millions of miles flown in Boeing planes. It is America's largest airplane factory's answer to the demand for an outstanding passenger transport—one which will not only return dividends to its owners in performance and economy, but which possesses refinements purchasers rightfully expect in this day of rapid progress in aeronautical design.

Boeing Air Transport Inc., has purchased a fleet of these planes for operation on the longest air-line in the world (San Francisco to Chicago). No other route in the U. S. includes such varied conditions of climate and altitude. Planes must fly from sea level to 12,000 feet. They will encounter ground temperatures ranging from 20 below zero to 135 Fahrenheit.

Such a route requires a plane engineered along sturdy lines, to be air-worthy under every condition which can be encountered in operations anywhere in the United States. Yet it must be swift, maneuverable, economical to operate and comfortable to ride in—in order to provide an attractive service to the traveling public (and a profit to its owners).

The first Model 80-A\* (displayed at the Cleveland Air Show) is now touring the east and middle west. To appreciate its superiority you should see it, ride in it or ask for a demonstration. Detailed information will be sent upon request.

\*NOTE: Model 80-A will also interest concerns who recognize the advantages and prestige of having their own air travel facilities.

## S P E C I F I C A T I O N S

Approved Type, Certificate No. 206. Engines: Three Pratt & Whitney 525 H. P. "Hornets"

### Performance (with full load—estimated)

High Speed . . . . .	138 M. P. H.	Climb in 10 Minutes . . . . .	7,000 Ft.	Take-off Time . . . . .	11 Seconds
Landing Speed . . . . .	55 M. P. H.	Service Ceiling . . . . .	15,500 Ft.	Wing Loading . . . . .	14 Lbs./Sq. Ft.
Rate of Climb . . . . .	999 F. P. M.	Take-off Run . . . . .	750 Ft.	Power Loading . . . . .	11.6 Lbs./H. P.

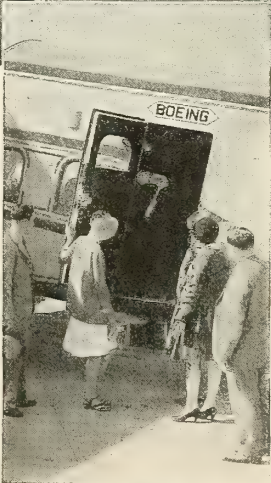
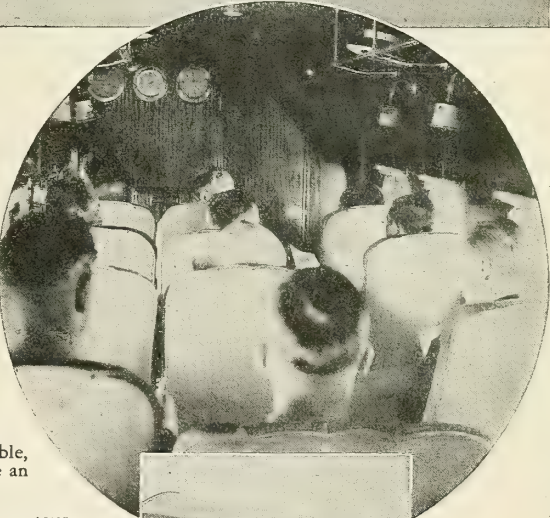
### Dimensions

Length overall . . . . .	55'	Wing Span—upper . . . . .	60'
Height over all . . . . .	19' 2"	Wing Span—lower . . . . .	64' 10"

### Weights

Weight Empty . . . . .	10,413 Lbs.	Oil (35.5 gallons) . . . . .	266 Lbs.
Useful Load (18 passengers) . . . . .	7,687 Lbs.	Actual Pay Load (18 passengers) . . . . .	4,081 Lbs.
Pilot and Mechanic . . . . .	340 Lbs.	Gross Weight Loaded . . . . .	17,500 Lbs.
Fuel (400 gallons) . . . . .	2,400 Lbs.		

**SPECIAL FEATURES**—Comfortably upholstered passenger seats. . . Cabin and cockpit heating and ventilation systems. . . Hot and cold running water. . . Toilet facilities. . . Metal racks for hats and small parcels. . . Fully-lighted cabin. . . Treadle type oleo landing gear. . . Foot-operated mechanical brakes. . . Retractable landing lights. . . Electric Inertia Starters on all motors. . . Bonded and shielded throughout for radio installation.



Entering this plane is like stepping into your own automobile.

Once inside the insulated and sound proofed cabin you relax in upholstered reclining, adjustable chairs.

The cabin is 19 feet long 6½ feet high 5½ feet wide. Roomy. Has many very distinctive features.

# BOEING AIRPLANE CO.

. . . Division of United Aircraft & Transport Corporation . . .  
**SEATTLE, WASHINGTON**







# ELEVATORS WERE OUT IN FRONT



WHEN THE

# U. S. RUBBER CO. BUILT THE FIRST PNEUMATIC AIRPLANE TIRES



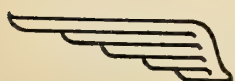
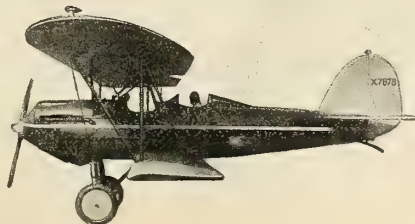
No company in its field has done more to promote the progress and safety of flying than the United States Rubber Co. Back in the days when the Wrights were thrilling the world with their daring—when elevators were out in front—when landing gears consisted of simple skids, U. S. engineers were at work on the problem of building pneumatic tires especially for aircraft use. Such tires measuring 20" x 3" were actually produced in 1908 and used by Glenn Curtiss and Orville Wright.

Larger and heavier tires soon followed and since that early date the U. S. Rubber Co. has continued to cooperate with the aviation industry in the development of

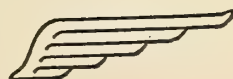
special tires to meet the exacting requirements of flying. Today this company is the only tire manufacturer who can offer Web Cord construction which gives the strongest and most durable tire structure which can be built. A complete range of sizes is available with either plain or non-skid tread, at all U. S. Branches.

UNITED STATES RUBBER COMPANY

Brunner-Winkle Bird Biplane equipped with United States Airplane Tires.



UNITED STATES  
A I R P L A N E  
T I R E S







Line up of planes in front of the new hangar at Central Airport, Camden, New Jersey

(Continued from preceding page)

by the Department of Commerce. Forty-four average size airplanes can be accommodated in the recently completed fireproof hangars, and indications are that the hangar space will be considerably increased in the near future to accommodate the commercial aviation needs for the Philadelphia region.

Offices for the flying services operating from this port, storerooms, and mechanics' quarters are located in the wings, on the right and left of the hangars. The Ludington Flying Service operates a regular passenger schedule from there to Cape Cod. The Curtiss-Wright Company maintains a taxi and sightseeing service at the port. Other commercial aviation companies are preparing to operate from this port.

The field is fully equipped with boundary and beacon lights. A new administration building, of a permanent type of construction, will soon be under construction on a location just below the hangars and adjoining the concrete highway to Philadelphia. It will include a passenger station, a radio control station, a ticket office and most of the facilities necessary for the operation of a thoroughly modern air transportation terminal. A temporary frame structure is now in use as an administration building. The management also has in mind to build a 100-room hotel for the accommodation of passengers and business visitors.

All future structures at the airport will be of concrete masonry, reinforced with steel where necessary, and surfaced with cement stucco. This is the type of construction in all the permanent buildings which have been erected thus far.

Central Airport to date represents an in-

vestment of \$2,000,000, about one-fourth of which was paid for land well in excess of 200 acres. (The airport corporation owns 350 acres altogether in this section.) The balance is for structures completed and under contract. Take-offs and landings are made from a large field to the right of the hangars where there are eight 2,500-foot natural runways and one of 3,600 feet in the direction of the prevailing wind. In addition to this, there are two 1,000-foot macadam take-off strips, fifty feet wide.

Overhead wires are now being removed from roads adjoining the field and are being run through underground conduits.

A swimming pool has been built on the airport grounds to provide recreation for visitors and for residents in the sections nearby. In conjunction with the pool is a recreation building equipped with 1,250 lockers. Free, protected parking space, with room for 4,000 cars, is provided.

A restaurant is operated within the grounds for the convenience of all employees at the airport, as well as visitors.

The airport is accessible in five directions by concrete highways.

Plans are under way for a comprehensive scheme of park development which will bound the airport on two sides. This, in addition to enhancing the beauty of the area, will attract many people to the airport and thereby provide additional potential traffic for operators who use the field. Moreover, safety of operation will be enhanced because of the large open spaces in the territory adjacent to the field, which would otherwise be impossible to obtain, especially in view of the accessibility of the field and its nearness to the center of Philadelphia and

Camden.

The directors of the operating company of Central Airport include many men prominent in aeronautical affairs of the country.

Following are the names of the officers and directors of Central Airport, Inc.: C. Townsend Ludington, chairman of the board; Nicholas S. Ludington, president; R. Sanford Saltus, Jr., vice-president; Robert P. Hewitt, second vice-president; C. C. Savage, Jr., secretary; W. C. Roberts, treasurer; C. M. Keys, Charles L. Lawrance, Edgar N. Gott, Henry B. DuPont, Wright S. Ludington, John J. Mitchell, Harold F. Pitcairn, J. Brooks, B. Parker, J. A. Sisto, Stevens Heckscher and Eric de Spoelberch.

## AIRPORT RATING APPLICATION FORMS

THE Aeronautics Branch of the Department of Commerce has issued an application form for the rating of airports for landplanes. The form requires the listing of complete information about the airport.

The application for rating, together with a graphic layout of the airport, is to be submitted to the Secretary of Commerce by the owner of the airport. This data is reviewed by the Aeronautics Branch, and if it is found to be complete and indicates that a rating is in order, a representative makes a physical examination at the airport. His findings are returned to Washington and reviewed in connection with the application before the certificate of rating is issued. The requirements of the Airport Rating Regulations are followed in the granting of ratings. Particular attention is paid in the examination to the firmness of the ground for landing and taking-off under all weather conditions, especially after rains, frost, etc.

A sketch or drawing of the airport must be submitted with the application which should be complete in detail, carefully dimensioned and drawn to scale of from 100 feet to 300 feet to the inch. It should show the layout of the airport, including landing area, landing strips, runways, airport markings, drives, tracks, location of buildings and other structures, location of all night flying equipment, location and height of obstructions surrounding the field, and direction of the city from the field.



Central Airport as seen from the air. Entire area below circle drive is airport property

AN increase of ten per cent in the use of air mail by residents of Des Moines during July and August over the use during May and June has been announced by Postmaster Edwin J. Frisk. The figures were based on the sale of air mail stamps.

THE LIFE PRESERVER OF THE AIR  
(Over 25,000 Happy Landings)

# Whenever You Fly— “You Can Bet Your Life on an **IRVIN**”

## Recently, IRVIN Air Chutes Saved Four Lives in Three Days

ON the last day of August and the first two in September, the lives of Miss Fay Gillis, Lieut. John Trunk, Lieut. Jimmy Doolittle, and of Charles Gatschet were saved to future service in aviation. They wore the Irvin Army service type Air Chutes.

For seventeen years this parachute, the only one enjoying all the advantages of some of the most basic and necessary air chute patents, has provided infallible safety in the air. The fame of Irvin is world-wide. In addition to the Army and Air-mail forces of the United States, the air forces of 30 foreign governments including Great Britain and Sweden, have chosen the Irvin Air Chute as regulation equipment.

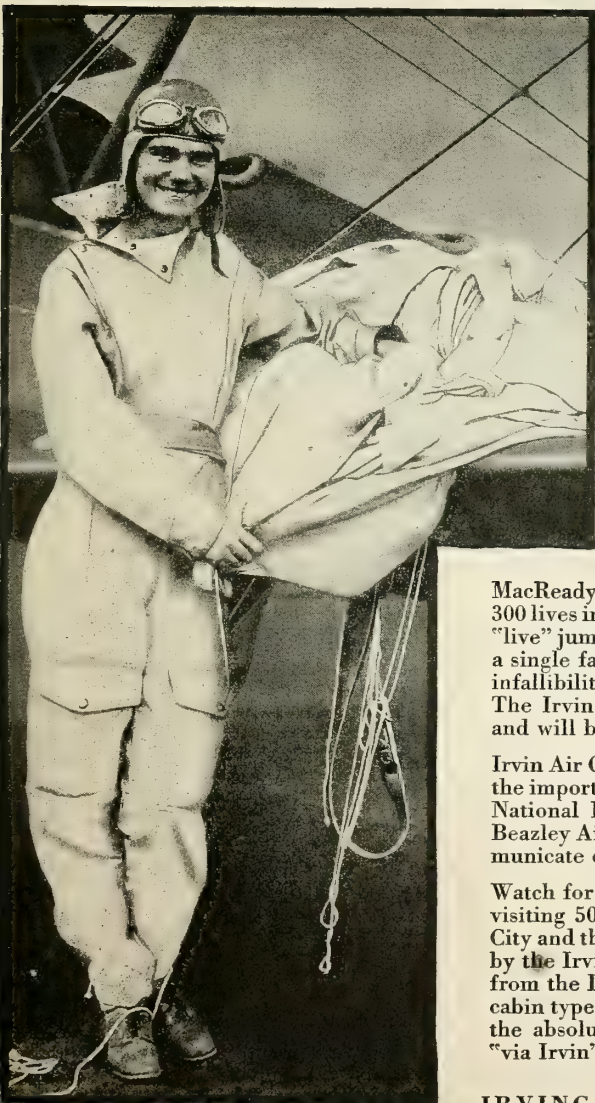
This is the air chute which has saved the lives of Lindbergh and McAllister, of Holman and of MacReady. This is the device of certain safety which has saved 300 lives in air emergencies of the past. It has a record for 25,000 “live” jumps made in every conceivable flying situation without a single failure. No other parachute can equal this record of infallibility in the air and of service to aviation’s progress. The Irvin Air Chute has been in the past, is in the present, and will be in the future, “The Life Preserver of the Air.”

Irvin Air Chutes are sold in all sections of the country. Among the important distributors are Curtiss Flying Service, Inc., The National Flying Schools, Air Associates, Inc., and Nicholas-Beazley Airplane Co. Dealers who are interested should communicate directly with the company.

Watch for the National Air-Safety Tour visiting 50 airports between New York City and the Pacific Coast and sponsored by the Irvin Air Chute Co., Inc. Jumps from the Irvin Safety Plane, an advance cabin type Bellanca C H 300, are proving the absolute safety and ease of decent “via Irvin”.

**IRVING AIR CHUTE CO., Inc.**  
Buffalo, N. Y., U. S. A.

Factories in Buffalo, N. Y. and London, England



Miss Fay Gillis, a pupil of the Curtiss Flying School at Valley Stream, L. I., who, with Lieut. John Trunk, her instructor, leaped from a disabled biplane 400 ft. in the air, and went up the same day to continue her lessons in flying.

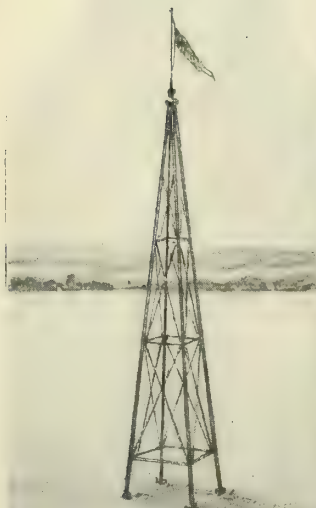
Our Motion Picture “Happy Landings” on standard width film, illustrating actual operation of the Irvin Air Chute is available free of charge to schools, clubs and organizations interested in aviation. Send for booklet and particulars.



# Kendall came to Cleveland



"Your devoted announcer"  
Swanee Taylor speaking



"attention please"

## ROLL CALL OF KENDALL OIL USERS in CLEVELAND RACES

	Place	Pilot	Type of Plane	Motor	Lubrication
<b>WOMEN'S DERBY</b>					
Class DW	1	Louise Thaden	Travelair	Wright J-5	Kendall Oil
Class CW	1	Phoebe Omlie	Monocoupe		Kendall Oil
	4	Thea Rasche	Gypsy Moth		Kendall Oil
<b>ALL OHIO DERBY</b>					
	1	Lewis Love	Davis Monoplane	LeBlond 5-cyl.	Kendall Oil
	3	Vernon L. Roberts	Monocoupe	Velie M-5	Kendall Oil
<b>MIAMI—MIAMI BEACH TO CLEVELAND AIR DERBY</b>					
Class B	1	Robert E. Dake	American Moth	Warner	Kendall Oil
	2	Chas. W. Meyers	Trainer 2T2	American Cirrus	Kendall Oil
	3	C. A. Burrows	Fleet		Kendall Oil
Class C	1	Geo. E. Halsey	Rearwin-Ken-Royce	Challenger	Kendall Oil
	2	J. Carroll Cone	Commandaire Sport	Challenger	Kendall Oil
	3	E. Z. Newson	Air Boss	Whirlwind J-6	Kendall Oil
Class D	1	Earl Rowland	Cessna Cabin	Warner Scarab	Kendall Oil
	2	Leslie H. Bowman	Monosport	Kinner K-5	Kendall Oil
	3	C. D. Bowyer	Cessna Cabin		Kendall Oil
<b>PHILADELPHIA TO CLEVELAND DERBY</b>					
Class D	1	Errett Williams	Alexander Bullet	Wright J-6	Kendall Oil
	2	Ike Stewart	Monocoach	Wright J-5	Kendall Oil
	3	Howard Young	Bellanca CH	Wright J-5	Kendall Oil
Class F	1	J. Wesley Smith	Bellanca CH	Wright J-6	Kendall Oil
	2	S. A. Riley	Travelair	Wright J-6	Kendall Oil
	3	R. P. Hewitt	Travelair	Wright J-6	Kendall Oil
<b>PORTLAND, OREGON, TO CLEVELAND DERBY</b>					
	1	T. H. Wells	Travelair	Wright J-5AB	Kendall Oil
	2	Tex Rankin	Waco Taperwing	Wright J-6	Kendall Oil
	3	Sydnor Hall	Travelair	Wright Whirlwind	Kendall Oil
	4	W. H. Emery	Travelair	Wright J-6	Kendall Oil
	5	G. H. Eckerson	Waco Taperwing	Wright J-5A	Kendall Oil
<b>OAKLAND, CALIFORNIA, TO CLEVELAND DERBY</b>					
	1	*Loren W. Mendell	Buhl Cabin Monoplane		*Kendall Oil
		*Used Kendall Oil from Salt Lake City to Cleveland			
	2	W. J. Barrows	Fairchild 71		Kendall Oil
	3	J. O. Donaldson	Travelair		Kendall Oil
<b>NON-STOP DERBY FROM LOS ANGELES TO CLEVELAND</b>					
	1	Henry J. Brown	Lockheed Air Express	Hornet	Kendall Oil
<b>RIM OF OHIO DERBY</b>					
	1	J. O. Donaldson	Travelair	Wright J-6	Kendall Oil
	2	W. J. Barrows	Fairchild 71	P. W. Wasp	Kendall Oil
	3	Loren W. Mendell	Buhl Cabin Monoplane	Wright J-6	Kendall Oil
<b>EVENT No. 1—Open to Women Pilots</b>					
	1	Phoebe Omlie	Monocoupe	Only	Kendall Oil
	3	Lady Mary Heath	Great Lakes	Warner	Kendall Oil
<b>EVENT No. 8—Civilians Only (OX5 Race)</b>					
	1	Geo. H. Shealey	Travelair	Curtiss OX5	Kendall Oil
	2	Wm. E. Winkle	Bird	Curtiss OX5	Kendall Oil
<b>EVENT No. 9—Civilians Only (510 Cub. In. Displ. Class Race)</b>					
	1	Vernon L. Roberts	Monocoupe	Warner Scarab	Kendall Oil
	2	R. T. Quinby	Monocoupe	Warner Scarab	Kendall Oil
	3	C. D. Clark	Travelair	Chevrolet D-6	Kendall Oil
	4	Chas. W. Meyers	Great Lakes	American Cirrus	Kendall Oil
	5	W. G. Moore	Inland Sport	Warner Scarab	Kendall Oil
<b>EVENT No. 10—Cleveland to Buffalo Efficiency Race</b>					
	1	Geo. Haldeman	Bellanca Cabin		Kendall Oil
	2	J. W. Smith	Bellanca Ch. 300		Kendall Oil
	3	Otis Beard	Fairchild 71		Kendall Oil
	4	H. P. Young	Bellanca		Kendall Oil
<b>EVENT No. 12—Relay Race for Civilians Only</b>					
	1	Doug. H. Davis, J. F. Gill	Travelair	Curtiss OX5	Kendall Oil
	2	C. E. Clark, H. McGouchey	Bird	Curtiss OX5	Kendall Oil
	3	W. D. Winkle, W. N. Raymond			
		H. G. Bissinger, K. F. Lovejoy	Travelair	Curtiss OX5	Kendall Oil
		Arthur Chester, S. Hopkins			
		Clark Smith, George Shealey			
<b>EVENT No. 13—Civilians Only (720 Cub. In. Displ. Class Race)</b>					
	1	Errett Williams	Eaglerock Bullet		Kendall Oil
	2	Vernon L. Roberts	Monocoupe	Warner	Kendall Oil
	3	R. T. Quinby	Monocoupe	Warner	Kendall Oil
	4	C. D. Bowyer	Cessna	Comet	Kendall Oil
	5	Geo. Halsey	Rearwin-Ken-Royce	Challenger	Kendall Oil
<b>EVENT No. 18—Civilians—Air Transport and Efficiency Contest</b>					
Speed	1	Geo. Haldeman	Bellanca	Wright J-6	Kendall Oil
	2	J. W. Smith	Bellanca	Wright J-5	Kendall Oil
Efficiency	1	Geo. Haldeman	Bellanca	Wright J-6	Kendall Oil
	3	C. W. Smith	Bellanca	Wright J-5	Kendall Oil
<b>EVENT No. 19—Civilians (800 Cub. In. Displ.) Cabin Ship Race</b>					
	1	R. W. Cantwell	Lockheed	Wasp	Kendall Oil
	3	J. W. Smith	Bellanca	Wright J-6	Kendall Oil
	4	H. D. Young	Bellanca	Wright J-6	Kendall Oil
<b>EVENT No. 35—Race for Aviation Town &amp; Country Club Trophy</b>					
Speed	1	E. Williams	Eaglerock Bullet	Wright J-6	Kendall Oil
	2	V. L. Roberts	Monocoach	Warner	Kendall Oil
	3	R. T. Quinby	Monocoupe	Warner Scarab	Kendall Oil
Efficiency	1	G. W. Haldeman	Bellanca	Wright J-6	Kendall Oil
	2	C. D. Bowyer	Cessna	Comet	Kendall Oil
	3	R. T. Quinby	Monocoupe	Warner Scarab	Kendall Oil

# with every National Derby winner

VISITORS to the National Air Races at Cleveland, August 24th to September 2nd, will never forget the dramatic finishes of the most spectacular and hotly contested air derby races in America's aviation history.

From the four corners of the United States—Portland, Oakland, Los Angeles and Santa Monica on the West Coast, Philadelphia and Miami on the Atlantic Seaboard—came a host of famous pilots, men and women, in fast high-powered airplanes. Motors were pushed to the utmost performance. Full throttle all the way. Day after day, as the furious pace increased, more and more revolutions were forced from the straining engines.

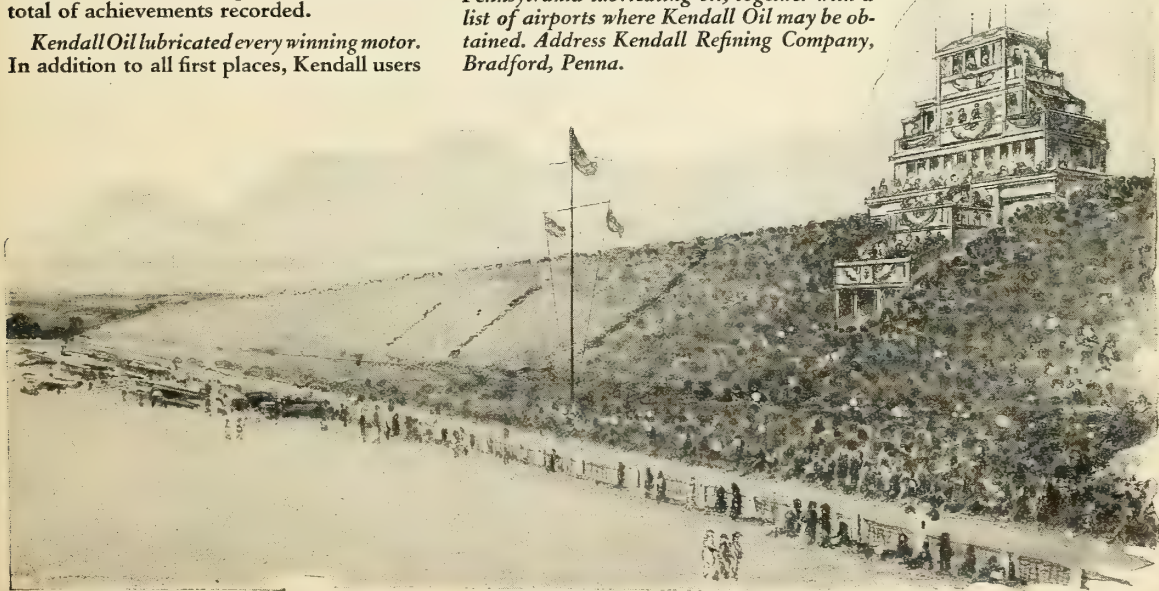
Time and again the daring contestants were required to fly through storms and fog, over scorching deserts, and under all sorts of adverse conditions, even including forest fires. Often at control points, the time between competing planes differed only by a few seconds. Each long lap was a grilling test of pilot, plane and motor. And the part played by dependable, efficient lubrication was one of the most important in the sum total of achievements recorded.

Kendall Oil lubricated every winning motor. In addition to all first places, Kendall users

also won second and third in all classes in five major derbies—Miami, Portland, Philadelphia, Oakland, Rim-of-Ohio. And in the Philadelphia Oakland, Portland and Rim-of-Ohio Derbies, Kendall came to Cleveland with every entry that finished. More glory—In the closed-course races at the Cleveland Airport a large majority of the winners also were Kendall victors.

Never before in American aviation annals has there been such an overwhelming demonstration of confidence in a lubricating oil. Never before has any oil achieved such an amazing percentage of representation in a competitive race-meet. Never has the story of Kendall superiority been demonstrated more vividly. The motor oil that helps make possible a score of hard-fought race victories, earns and receives acclaim wherever airplanes fly. The lubrication choice of every winning pilot in the great trans-continental derbies of 1929 is rapidly becoming the choice of well-informed pilots everywhere.

*We will be glad to send you full information about this remarkable all-Bradford Pennsylvania lubricating oil, together with a list of airports where Kendall Oil may be obtained. Address Kendall Refining Company, Bradford, Penna.*



# KENDALL OIL



REFINED FROM 100% BRADFORD  
GRADE OF PENNSYLVANIA CRUDE





# TECHNICAL

## THEORY OF THE AUTOGIRO

By

Señor Juan de la Cierva

*Paper presented at the Great Lakes Aeronautic Meeting of the Aeronautic Division of the American Society of Mechanical Engineers, Cleveland, Ohio, August 31, 1929.*

**B**ECAUSE most persons already know what the autogiro is, how it looks, how it works, I am not going to enter into a detailed description of the autogiro as such. Instead, I shall try to convey briefly the philosophy of the autogiro, as an introduction to its theory.

I have been working many years on the conventional airplane. I am a great enthusiast of the airplane, for I think it is the most marvelous invention of modern times; but a long time ago I came to the conclusion that the plane had fundamental limitations due to its own nature. I tried, therefore, to produce a new system of flying, free from those limitations. I thought that the airplane could be improved quantitatively in every direction, but my thought was and still is that no improvement can change the very nature of the airplane and its qualitative limitations.

After a certain amount of theoretical work, I reached the conclusion that the only method for removing those fundamental limitations was to make the wings relatively independent of the frame or body of the machine, so as to make it possible to keep them going fast through the air while the machine could be going slowly or even be stationary. I saw the possibility of achieving this result without the introduction of mechanical complications such as those which inevitably occur in helicopters, ornithopters, or generally speaking, flying machines with driven wings. I started then the study of a very primitive autogiro which was related to the existing machine only by the fundamental idea of freely rotating wings.

I am not going to explain in detail the

long and painful experimental period through which the autogiro has passed to reach its present development. I point out to you only that I didn't achieve success at all until I had the idea of articulating the blades of the autogiro so as to let them flap freely, since there were too many mechanical and aerodynamical problems that could be solved only in that way.

The main problem I solved in this way was the dissymmetry of the reactions on opposite blades, since there is a single group of them rotating in the same direction. On one side of the machine the speed for a given point of the blade will be the addition of the general speed of advance of the machine, and the peripheral speed, while in the opposite, will be the difference.

To balance the lift in those two opposite planes by means of controls that would periodically change the incidence of the blade is a most difficult problem, but this solution of the articulation does it automatically and in a very simple way.

The aerodynamics of the autogiro appears as a very complicated problem, if one realizes how difficult are the problems involved in the calculation of ordinary propellers, considering the autogiro can be likened to a

propeller with three or four more parameters. It is a propeller which is advancing through the air with a great obliquity and with blades which are free from flapping. The speed and the incidence at every point of every blade at every moment is different. I cannot attempt herewith to make a detailed analysis of the aerodynamical qualities of the autogiro and compare them with those of the ordinary airplane. Nevertheless, and in answer to an extended criticism of the autogiro, I want to point out to you that there is no fundamental reason why the autogiro should be aerodynamically inferior to the airplane. It has been said that since the speed of the blades of the autogiro through the air is higher than the corresponding speed of the wings of a conventional airplane, the energy expended will be greater. The autogiro because of its special qualities in landing is free from the necessity of having big wing surfaces and, in consequence, can utilize very high wing loadings which means higher aerodynamical efficiency.

By its aerodynamical nature the autogiro is not subject to any of the risk of stalling. The wings always move fast through the air, whatever the speed of displacement of the fuselage. It can be stopped in the air for one moment without losing completely its lift. If by a sudden maneuver, the pulling back of the stick, the machine is brought to a standstill in the air, the wings still continue rotating under the action of the inertia for the first moment, and they still give a certain amount of lift which makes the machine fundamentally different from the airplane, which, when it is stalled, loses all grip on the air. Since the movement of the blades continues even when the machine is not moving with any forward speed, the autogiro can become a parachute at the will of its pilot.

A most interesting aerodynamic problem can be pointed out in this connection. I had predicted as far back as 1921, by theoretical considerations, since confirmed by experiments which have been checked by the officials of several governments, that the efficiency of the autogiro as a parachute is considerably higher than that of the ordinary parachute. As a fact it doesn't need discussion, but I should like to point out to you that its efficiency as a parachute is as high as three times that of an ordinary parachute formed by a disc of the same diameter of its rotor.

The physical explanation of that phenomenon is that, contrary to what most aerodynamicists think, the mass of air influenced every second is much larger than that corresponding to the volume equal to the product of the surface of the rotor by the speed of descent. The ordinary parachute practi-

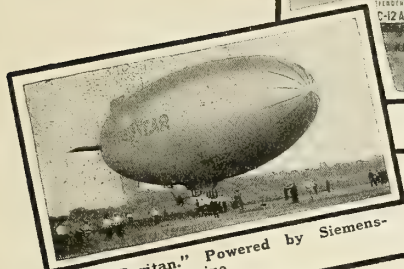
*(Continued on next page)*



Señor Juan de la Cierva flying his autogiro in the United States recently



The "Defender." Powered by Wright J-6 Engines.



The "Puritan." Powered by Siemens-Halske engine.



The "Vigilant." Powered by Warner engine.



The "Mayflower." Powered by Siemens-Halske engine.



The "Volunteer." Powered by Siemens-Halske engine.

## GOODYEAR AIRSHIPS use HEYWOOD STARTERS

The Goodyear Zeppelin Corporation, who are manufacturing both non-rigid and rigid Airships use Heywood Starters on their complete fleet of dirigibles.

The world famous Goodyear organization selected the Heywood Starter for its fleet because of its proven reliability, efficient operation and simplicity in design.

Heywood Starters are made for all types of aeroplane engines. The new and lighter Heywood Starter is more and more being adapted by the leading aeroplane manufacturers, as well as by individual owners throughout America.

This starting unit is compact, light and composed of very few sturdy and simple parts. It will pay you to send for the Heywood literature which shows the many features of this most advanced product.

Write today for complete information.

**SKY SPECIALTIES CORPORATION**

3651 Hart Ave.

Detroit, Michigan

*'Starter by  
Heywood'*

# HEYWOOD STARTER

Say you saw it in AERO DIGEST



(Continued from preceding page)

cally has an efficiency corresponding to the optimum in this assumption and, if one considers the great amount of energy wasted in the complex vortexes in its wake, it is obvious that a much greater efficiency can be achieved by a parachute, like the autogiro, in which the flow is much more smooth and regular. My theoretical results are that the optimum possible parachute would have an efficiency equal to six times that of the

disc and the present autogiro achieves about fifty per cent of that optimum.

Structurally the autogiro is based on a very different principle than the airplane. The wings of the airplane are constructed in such a way as to resist stresses by rigidity, whereas the autogiro is a flexible structure; sudden changes in incidence or speed do not increase the structural stresses in the same measure as they increase those of an airplane. The centrifugal force which

keep the blades approximately horizontal acts as a spring on long travel, and gives the autogiro the quality of a much greater comfort, a smoothness in flight which is thoroughly different from the feeling that is produced in the flight of an airplane in bumpy weather. Many people ask whether the autogiro can fly in bumpy weather. The answer is that the autogiro is much less sensitive to bumps than is an ordinary airplane because of its structural flexibility.

## VICKERS "VELLORE" BIPLANE

**T**HE Vickers Vellore is a two-bay biplane freight carrier with folding wings; it is manufactured by the Vickers (Aviation) Limited of London, England. The plane is designed as both a commercial and military transport. A large cargo space is provided for freight or ammunition and military stores, and removable seats are supplied for the transportation of passengers or troops. The construction of the Vellore is unusual in the suspension of the fuselage between the upper and lower wings by means of struts. The plane carries a load of 3,600 pounds, and has a high speed of 114 miles per hour, a cruising speed of 85, and a ceiling of 17,000 feet.

The Vellore is equipped with one engine in the nose of the well-streamlined fuselage. Either a Bristol Jupiter Mark IX of 485-525 horsepower or an Armstrong-Siddeley Jaguar geared engine of 460 horsepower is used as the power plant on the transport. The engine can be taken out of the plane by the removal of four bolts. Vickers-Potts oil-coolers are used to preserve a constant oil temperature, and are fitted on the fuselage immediately behind the engine.

The Vellore is constructed entirely of duralumin. The duralumin is proofed against corrosion by treatment with the anodic process, and afterward sprayed with a cellulose paint. The superstructure and rear portion of the fuselage are covered with fabric and doped to an approved specification. The wings have a span of 76 feet, and are braced on each side by two sets of vertical interplane struts, reinforced by drag wires. With wings folded the plane has a width of 20 feet 9 inches. The floating rib is used in the wing structure to facilitate wing repairs. Two gas tanks holding 162 gallons of fuel are placed in the upper wing on each side of the fuselage. This supply is sufficient for a 700-mile trip at cruising speed.

All controls on the Vellore freight carrier are balanced. Ailerons extend from the rounded wing tips well into the wing on both upper and lower wings. The empennage is of the biplane type, having double stabilizers with four vertical rudders between them.

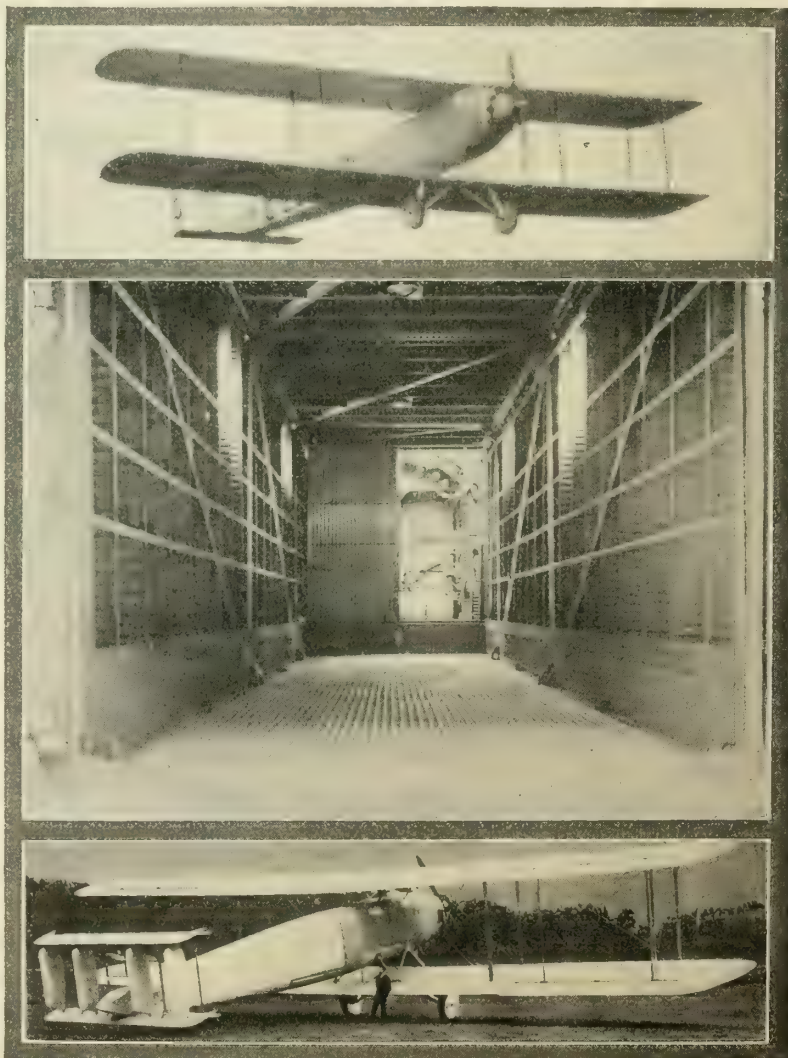
The fuselage is supported above the lower wing by oblique struts arranged to brace the weight from all angles. Two oblique struts join the fuselage to the upper wing. The dimensions of the interior of the all-metal cabin are approximately 12¾ feet

long, 4¾ feet high, and 3¾ feet wide. The capacity is 225 cubic feet. A hinged door between the cabin and rear portion is provided on the under side of the fuselage with block and tackle for handling freight. The dimensions of this opening assure the easy loading of lengths of pipe lines, machine tools, or large bulky articles. The door, when shut and locked, conforms to the streamlining of the aircraft. The pilot's cockpit is behind the engine mount, below and in front of the upper wing.

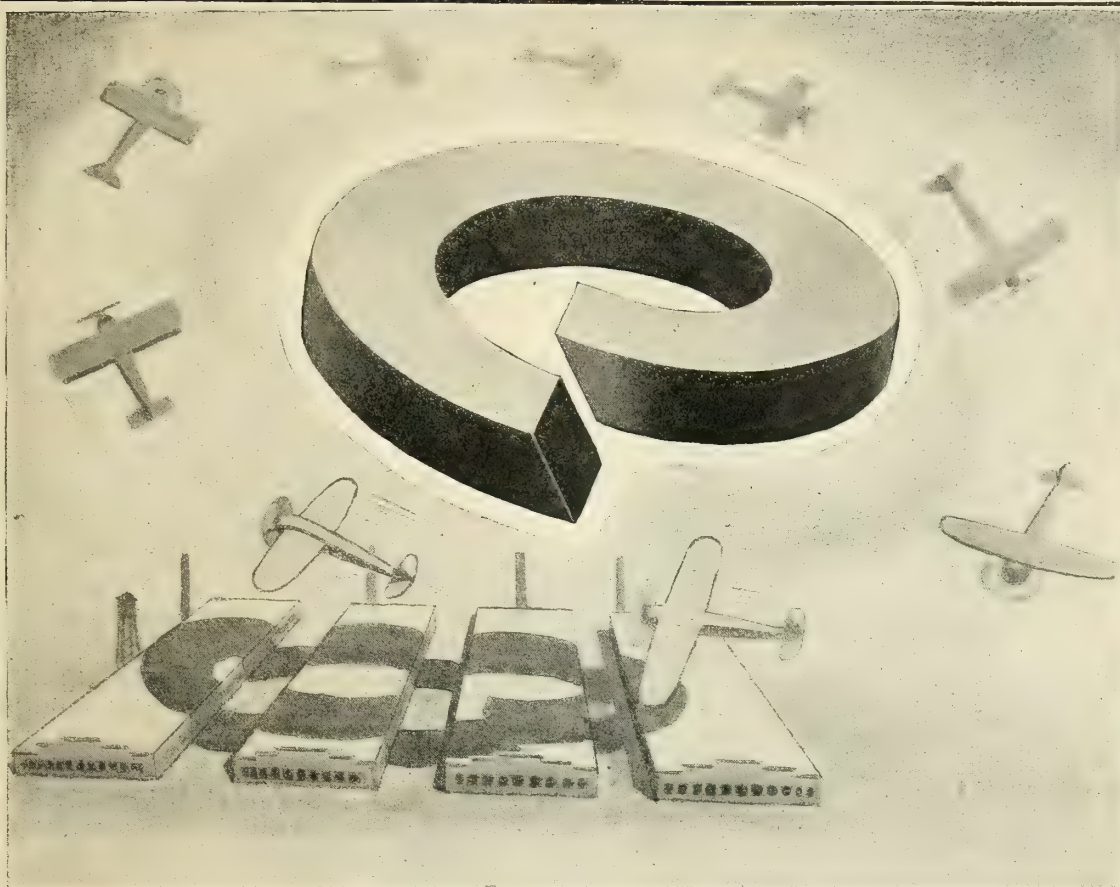
### Specifications

(Bristol Jupiter Mark IX engine)

Length .....	51 feet 6 inches
Span .....	76 feet
Width folded .....	20 feet 9 inches
Height .....	16 feet 3 inches
Weight empty .....	4,759 pounds
Pay load .....	3,600 pounds
Weight loaded .....	9,500 pounds
Landing speed .....	48 miles per hour
Maximum speed .....	114 miles per hour
Initial rate of climb ...	515 feet per minute
Climb to 4,920 feet .....	11½ minutes
Absolute ceiling .....	17,100 feet



Exterior and interior views of the Vickers "Vellore" freight plane



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# ARROW SPORT PURSUIT

A NEW Arrow Sport biplane designated as the Arrow Sport "Pursuit," and incorporating a number of refinements and improvements, has been placed in production by the Arrow Aircraft and Motors Corporation of Havelock, Nebraska. The new ship, which is powered with a Kinner engine, is designed for sport and training. It is said to have a greatly increased performance range.

Flight tests made at the Arrow Airport, near Lincoln, have demonstrated that the plane has a high speed of 110 miles per hour and cruising speed of 95 miles an hour, with a cruising range of 300 to 400 miles. The new ship lands slowly, takes off with about a 125-foot run, and climbs 1,200 feet the first minute. Its service ceiling is 14,000 feet.

Like the Arrow Sport "60" and "90," the two LeBlond-powered models, the Pursuit has a single dual companion cockpit, well upholstered. Both seats are fitted with deep cushions, which are removable to permit the use of parachutes. The cockpit is fitted with dual controls, and either stick can be removed.

Two independent sets of controls are fitted, actuated by push-pull rods, with the exception of the rudder which has the conventional cable hook-up. Ball and socket control joints are used throughout. The control bearings are babbitt lined with self-aligning mounts which prevent binding under torsional stresses. Differential aileron control

is provided. Both fin and horizontal stabilizer are adjustable, the latter by a lever within the cockpit.

The taper wings are full cantilever and have a marked stagger. The upper wing is bolted to four cabane struts, and the lower is recessed into the fuselage. There are no external wing bracings except in the center section, and the wing tips are rigidly held by N-struts. The upper wing has a span of 25 feet 10 inches; the lower, 25 feet 4 inches. Overall length is 19 feet 3 inches. Height is 8 feet.

Fuselage is of seamless steel tubing, constructed with Warren truss system. It is a standardized production unit, finish welded in the jig to relieve all stresses, and, as a protection against corrosion, thoroughly processed before being covered.

The tail group is of all-metal construction of exceptional ruggedness and strength. The ship is built ruggedly throughout in anticipation of rough handling by students and the rapidly growing number of amateur fliers who want an economical, sturdy plane with a high factor of safety, good performance, stability, and easy handling.

Features which are especially adapted to such usage include the wide, husky landing gear, and the rubber mounted spring tail skid which absorbs shocks in taxiing. The ship is especially designed to get in and out of small fields, with a slow landing speed and fast take-off and climb. In factory tests the landing gear has withstood

4,000 foot pounds drop tests without failure. In another safety test the ship was landed without damage with both shock cords served.

Standard equipment of the new Kinner-powered Pursuit includes tachometer, altimeter, oil pressure gauge, engine thermometer, gasoline gauge, choke, throttle and ignition control, navigation lights, and Pioneer compass.

## BRITISH REQUIREMENTS FOR AIRCRAFT TUBING

By HENRY SEARS HOYT

A. Milne and Company

(Courtesy of The Iron Age)

PRESENT British practice does not use "ordinary seamless tube" in any vital parts of the fuselage. The specification used in places where United States practice employs S. A. E. No. 4130X (chrome-molybdenum) is covered by Provisional Air Ministry Aircraft Specifications Number D. T. D. 89A and Number D. T. D. 113, the former covering all round tubes down to and including 1/2-inch diameter, and the latter all round tubes below 1/2-inch diameter, and all sizes of non-circular tubes.

The steel covered by these specifications is of the following approximate analysis, being directly quoted from copies of the specifications:

Carbon	..... not more than 0.30 per cent
Silicon	..... not more than 0.30 per cent
Sulphur	..... not more than 0.050 per cent
Phosphorus	...not more than 0.050 per cent
Manganese	....not more than 1.50 per cent

Specification No. D. T. D. 89A calls for the following physical properties:

Lbs. Per

Sq. In.

Tensile strength before welding, min. 100,800

Yield stress before welding, min.... 89,600

Tensile strength after welding, min. 67,200

Yield stress after welding, min..... 56,000

Specification No. D. T. D. 113 calls for the following physical properties:

Lbs. Per

Sq. In.

Tensile strength before welding, min. 78,400

Yield stress before welding, min.... 67,200

Tensile strength after welding, min. 67,200

Yield stress after welding, min..... 56,000

This contrasts with the S. A. E. 4130X minimum ultimate strength of 55,000 pounds and yield point of 36,000 pounds.

British aircraft engineers and metallurgists with whom I have talked pointed out the much higher yield point required by the British Air Ministry specifications, and also the much higher yield point obtainable by the use of this 1.50 per cent manganese tubing. They also claim that with the high manganese tubing there is no tendency to air harden at the weld as is the case with the chrome-molybdenum specification, thereby causing brittleness in the joints.

It would seem that in the matter of aircraft tubing the British are more exacting than our own people.



The Kinner-powered Arrow Sport "Pursuit" biplane

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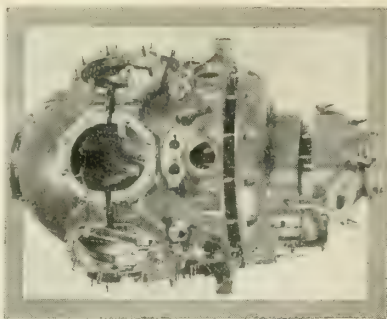


# AXELSON TYPE B 150 H.P. ENGINE

**T**HE latest product of the Axelson Aircraft Engine Company of Los Angeles, the Axelson Type B, 7-cylinder, 150 horsepower fixed radial aircraft engine, was among the new power plants exhibited at the Cleveland air show.

It is stated by officials of the Axelson Aircraft Engine Company that service facilities have been located in strategic points throughout the country where Axelson engine service may be obtained.

Among the refinements that have been made in the Axelson engine is an improvement in the oil circulation system, which provides a more economical oil recovery system. The oil passes from the supply tank through the pressure pump, on the rear of the engine, entering the hollow crankshaft. Oil passages are integral with the crankcase. The oil leaves the crankshaft at the front main bearing, passing through the pressure relief valve which is built into the front crankcase section. From the relief valve, the oil enters the oil sump, where it is passed through a double mesh screen. It then leaves the oil sump via a short external line of ample diameter (the only external line of the entire system), passing through the scavenging pump into the oil cooler. Oil temperature is there modified, the excess heat being transmitted to the intake mixture. The scavenging pump adjoins the oil cooler and is connected directly thereto without any piping. The cycle is completed by connection from the oil cooler back to the supply tank. Proper crankcase ventilation is assured by the front oil breather and two breathers located in the central crankcase section.



**Axelson crankcase**

Among the other refinements in the Type B engine are a cleaner appearance, fewer parts and a sturdier construction throughout.

Some minor changes have been made in the design, including a different setting for the magnetos and greater streamlining of the crankcase and cylinders.

## Specifications

### GENERAL FORM

Number of cylinders	.....7
Type	.....Static, radial, air-cooled
Bore	.....4.5 inches
Stroke	.....5.5 inches
Piston displacement	.....612.3 cubic inches
Compression ratio	.....5:1
Revolutions per minute	.....1,800

### DIMENSIONS AND WEIGHTS

Height	.....45 inches
Length	.....37¾ inches
Width	.....45 inches

Distance from mounting flange to center of gravity	.....4½ inches
Distance from front end of propeller to mounting flange	.....25¾ inches
Weight complete, without propeller hub or starter	.....420 pounds

### PERFORMANCE

Rated power (sea level)	...150 horsepower
Fuel consumption per horsepower hour	.....0.55 pounds
Oil consumption per horsepower hour	......017 pounds

### VALVES

Number per cylinder	.....2
Form	.....tulip
Seat angle	.....45 degrees
Lift	.....½ inch
Valve diameter	.....2⅞ inches
Valve opening in seats	.....1⅞ inches
Diameter, intake valve stem	.....⅞ inch
Diameter, exhaust valve stem	.....⅞ inch
Springs	.....2 per valve
Springs	.....Helical type

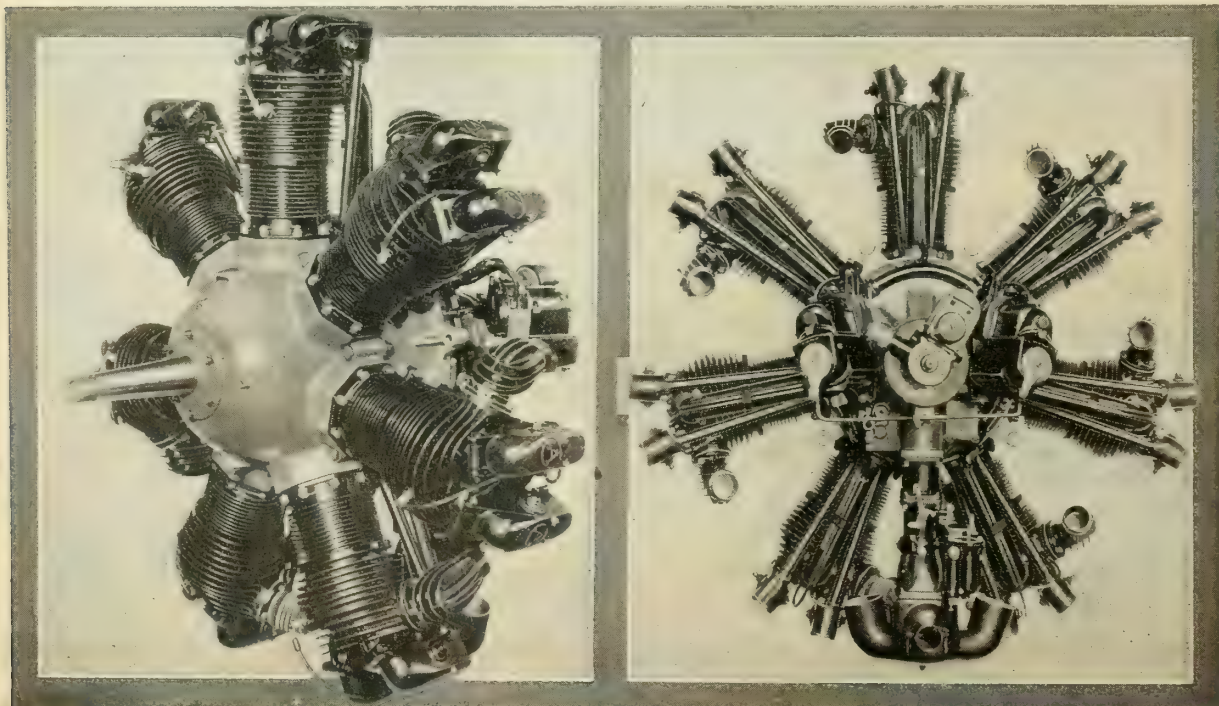
### IGNITION

Number of magnetos	.....2
Type of magnetos	.....Scintilla MN7-DF
Magneto rotation (looking from cockpit)	.....counter-clockwise
Magneto speed	.....⅞

### ACCESSORIES

Starter mounting (either hand, inertia, or air starter)	.....S.A.E. standard
Fuel pump mounting	.....S.A.E. standard
Fuel pump speed	.....½ crankshaft
Fuel pump rotation (from cockpit)	.....clockwise
Tachometer shaft speed	.....½ crankshaft

(Continued on next page)



The clean lines of the 150 h.p. Axelson engine are well illustrated in these views

# DISTINGUISHED FROM ALL OTHERS BY PERFORMANCE

On the take-off . . . in the air . . . slipping into the small field . . . no matter what the task or condition may be, Spartan is distinguished from all others by performance.

The new Spartan C-3-165 comes from a background of years filled with scientific research, of experiment involving rebuilding, testing and re-designing. The result is an airplane designed and built to give faithful, uninterrupted service, amply powered by the Wright "Whirlwind Five" and scientifically correct from the standpoint of modern, progressive engineering. In no other airplane is craftsmanship more apparent than in the new Spartan. A rigid manufacturing policy

which places quality before quantity insures final perfection of every detail. Inherent stability is a characteristic upon which Spartan owners may rely for accurate, unfaltering flight under any condition. And, finally, back of Spartan is the security of an organization possessing both the purpose and resources to remain in the forefront of American airplane manufacturers.

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WRITE FOR INFORMATION  
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SPARTAN AIRCRAFT COMPANY  
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DESIGNED TO BE SAFE . . . . . BUILT TO STAY SAFE



(Continued from preceding page)

Tachometer rotation (from cockpit) .....clockwise

## CRANKSHAFT

Overall length .....23 $\frac{1}{8}$  inches  
Journal diameter .....2 $\frac{1}{2}$  inches  
Crank pin diameter .....2 $\frac{1}{8}$  inches  
Number of bearings .....2 main  
Direction of rotation (from cockpit) .....clockwise  
Propeller shaft end .....No. 2 S.A.E. taper

## CONNECTING RODS

Length, center to center .....9 $\frac{3}{8}$  inches  
Type .....I-section

## CAM

Number .....1  
Length .....2 $\frac{1}{4}$  inches  
Diameter .....5 $\frac{1}{8}$  inches  
Speed of cam ..... $\frac{1}{2}$  crankshaft  
Carburetor .....Stromberg NA-R5

## LUBRICATION

Oil pressure .....65 pounds per sq. in.  
Quantity of oil circulated...34.3 lbs. per min.  
Minimum safe quantity of oil in entire system .....3 gallons  
Recommended quantity of oil ...6-8 gallons  
Maximum permissible oil temperature under extreme conditions...180 degrees F.  
Desired oil temperature.....120 degrees F.  
Oil pump .....Duplex gear type  
Speed of oil pump ..... $\frac{1}{2}$  crankshaft  
Rotation of oil pump (from cockpit) .....clockwise

## MATERIALS

Pistons .....aluminum alloy  
Cylinder barrels (with integral cooling fins) .....steel  
Cylinder heads .....aluminum alloy  
Crankshaft .....alloy steel  
Valve seats .....special bronze  
Valves .....alloy steel  
Valve guides, intake .....bronze  
Valve guides, exhaust .....steel  
Connecting rods .....steel  
Crankcase .....aluminum alloy

# ALLIANCE

## "ARGO"

### BIPLANE

THE Alliance Aircraft Corporation, Alliance, Ohio, manufacturer of the Argo biplane, is one of the country's few aircraft concerns which builds both plane and engine. The Argo is a small two-place plane designed for training purposes, messenger service, and for sportsmen.

The Hess-Warrior engine used in the Argo biplane was designed and is built by the Alliance Aircraft Corporation. It is a seven-cylinder radial air-cooled engine weighing 295 pounds, without the propeller. With a 4 $\frac{1}{4}$ -inch bore and a 4 $\frac{1}{2}$ -inch stroke, the engine will develop 125 horsepower at 1,800 revolutions per minute and consumes less than 10 gallons of gasoline per hour. The cylinder construction uses composite, forged steel barrels with aluminum alloy heads, screwed and shrunk on. Combustion chambers are hemispherical with inclined valves shrunk in bronze valve seats. Spark plug openings are bronze bushed. The crankshaft is mounted on three bearings, two roller bearings to absorb radial loads and a ball bearing for propeller thrust. The master rod bearing is steel backed and babbitt-lined. All accessories, including twin magnetos, are mounted in the rear of the engine.

The wings of the Argo biplane are braced by oblique N interplane struts and drag wires. The upper wing is joined to the fuselage by an irregular N strut slanted outwards. Fuel is carried in a tank located in the center section over the fuselage. The fuel lines, which are constructed of half-inch annealed copper tubing, are cushioned in rubber.

The fuselage is of chrome-molybdenum tubing throughout. All tubing is treated externally and internally against corrosion. The two cockpits are located well back, and the center section is cut away to give good visibility from both cockpits. The edge of the fuselage is padded, and windshield and head rest are supplied. Dual controls are standard equipment on the Argo. Ailerons are located in both upper and lower wings. The stabilizer is adjustable in the air, and the fin can be set to counteract torque reaction. Instrument equipment includes tachometer, oil gauge, oil temperature gauge, air speed indicator, altimeter, compass and ignition switches. Navigation lights are standard equipment. The propeller is Standard Steel with adjustable pitch designed for this airplane.

Tests show a cruising speed of 100 miles per hour with a high speed of 130 miles per hour, a take-off of 5 seconds and a landing speed of 44 miles per hour.

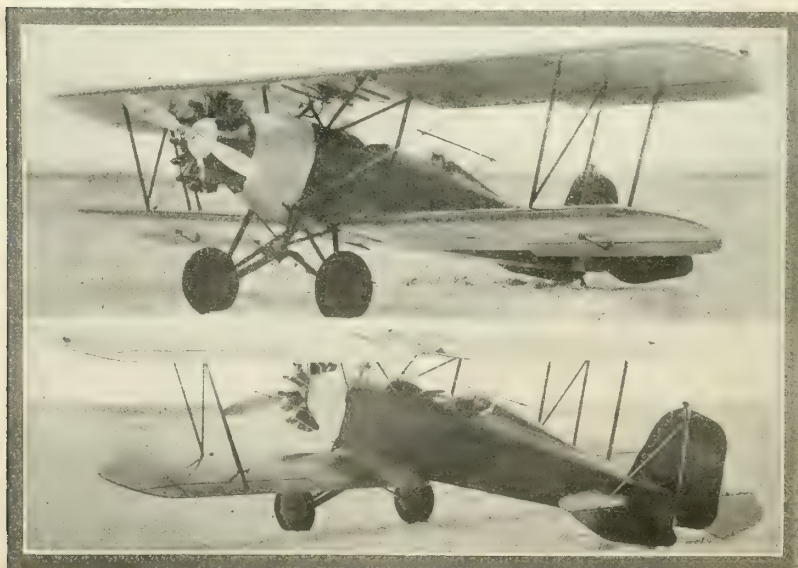
## HILBURN DUAL SAFETY CONTROL

EXPERIMENTAL work on two new safety devices for airplanes is under way in Oakland. At the factory of the Aeronautical Engineering Company, engineers are constructing a safety dual control, designed by Earl Hilburn, an executive of the company.

By pulling a plunger which protrudes from a tube fitted into the instrument board, the pilot can instantly disconnect both the rudder and stick of the second set of controls according to the inventor. Pushing the plunger and a sharp movement on the dual stick and rudder re-connects the second set of controls.

At the bottom of each stick of the Hilburn dual control is a grooved ball into which is fitted the rods connecting to the aileron and flipper cables. A cam, located under the floorboards, locks the rods into place in the grooves of the ball, permitting normal action of the stick. The cam also locks into place the rods controlling the rudder action. To each cam is connected a Bowden wire control. The wire controls, surmounted by a collar, lead to tubes fitted into the instrument boards. The installations on both controls are similar. Pushing the plunger into the tube and giving it a half turn locks it into the collar of the wire control. The Hilburn control will eliminate the task of connecting and disconnecting the conventional dual controls. With the Hilburn control, the stick and rudder work freely when disconnected, permitting the placing of them in any position to provide additional leg room.

In tests, with the second set of controls absolutely "frozen" a pull of less than 25 pounds on the plunger instantly disconnected the stick and rudder. The Hilburn control is constructed of aluminum and in weight the entire assembly is approximately equal to that of the conventional dual controls now used on training and sport planes in this country.



The Hess-Warrior engined "Argo" biplane produced by the Alliance Aircraft Corp.

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## THE BOEING MODEL 80-A TRANSPORT

**A**FTER completing flight tests on the West Coast, the new Boeing 18-passenger tri-motored transport, the latest product of the Boeing Airplane Company of Seattle, Wash., was flown to Cleveland for display at the aeronautical exposition held in conjunction with the National Air Races. Powered with three Pratt and Whitney Hornet engines developing a total of 1,575 horsepower, ships of this type are to be used on the Boeing airlines from San Francisco to Chicago and from Seattle to Los Angeles.

The unusual size of this plane is indicated by the fact that, although it is a biplane, the span of the upper wing measures 80 feet; its length overall is 55 feet, and its height 15 feet. Fully loaded, the plane weighs 17,500 pounds, or more than eight and one-half tons.

Fitted with N.A.C.A. cowlings on all three engines, the ship presents a particularly clean and well finished appearance.

The interior of the passenger cabin, which incorporates railroad coach precedent in general appearance, is both handsome and spacious. The walls and ceiling are finished in polished dark mahogany which harmonizes effectively with the black walnut trim and brown upholstery of the chairs. The passenger cabin is divided into two sections, the larger of which accommodates fifteen persons, and the other of which, between the pilot's compartment and the main section of the cabin, seats three persons. When there are fifteen or less passengers and the mail loads are heavy, the chairs in the small compartment may be removed to permit the loading of mail cargoes.

The chairs, which were designed and con-

structed at the Boeing plant, are made of laminated black walnut, well-polished, and comfortably upholstered with sedan cloth, which is easily removable for cleaning. The backs are adjustable, and the passengers may set them to any angle desired. The chairs are secured to the floor by a locking device on the legs, but may easily be removed for cabin cleaning or for converting the transport into a mail-express carrier or "flying postoffice." The chairs are so arranged that ample leg room is assured.

Passengers are afforded excellent vision, for the windows located by each chair are large and relatively unobstructed. They are made of clear safety glass plate. At each window frame there is an individual ventilator, known as the Aerovent, which may be adjusted to suit individual needs. There is also the general ventilation system, including two larger ventilators which are located at the rear of the cabin because the flow of air in the cabin of an airplane in flight is from front to rear.

The walls and ceiling of the cabin are made of a plywood of three-ply thickness. The inside layer is mahogany; the center ply is balsa wood, which serves as a sound insulation; the third and outer ply is also mahogany, selected because of its strength and stiffness. The floor of the cabin is made of corrugated dural, covered with a sheet of rubberized fabric which can be removed for cleaning.

In planning the interior arrangement and fixtures, the Boeing company provided especially for adequate lighting, inasmuch as a great part of the route over which these ships will be put in service is flown at night. The usual dome lights are augmented by

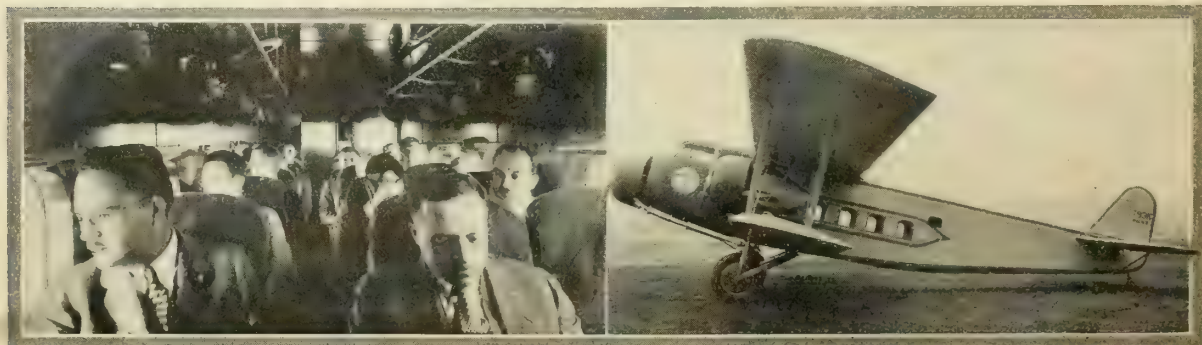
individual electric lamps above each chair. There is a total of twenty-seven electric lights, most of which are controlled with individual switches. At the front of the cabin are altimeters, air speed indicators and clocks set in the wall for the benefit of the passengers.

Because such wide variations in temperature are encountered along the transcontinental airway, particular effort was made to provide a suitable heating system for the cabin. The heat of the exhaust stack from the control engine is utilized for this purpose, a "stove," or dural cylinder around the exhaust pipe, serves as an intake for fresh air which is warmed by contact with the hot exhaust stack. The heated air is then directed up into the cabin through dural conduits, which are carried along both sides of the base of the cabin to the rear end, where the warm air escapes from small outlets. The flow of warm air can be adjusted from the interior of the cabin to suit the heating requirements. With the auxiliary individual ventilators, the passenger may control the cabin temperature in his vicinity to suit himself.

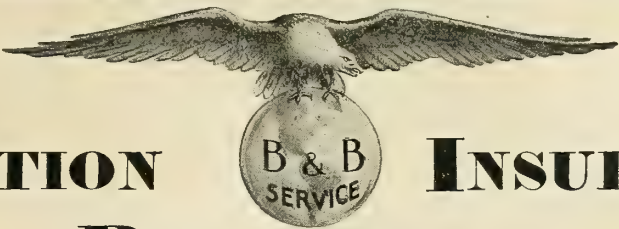
The pilot's compartment is equipped with remote control for the radiophone communication set, which is located back of the passengers' cabin. By means of this development, the pilot, flying at an elevation of 12,000 feet, may turn a switch and talk in a normal voice with an operator at a ground transmitting and receiving station as distant as two hundred miles. The ship is also equipped for reception of radio beacon signals.

There are eighty-three controls, instru-

(Continued on next page)



Seating arrangement and a direct side view of the Boeing model 80-A transport



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*The foregoing facts are the result of maintaining consistently over a long period of years B. & B. SERVICE, STABILITY AND SECURITY*

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(Continued from preceding page)

ments and control switches on the eighteen-passenger ship.

The wings are fabricated of heat-treated dural tubing, bolted with dural bolts, and covered with airplane cloth treated with five coats of dope and three coats of enamel. The tips are of spruce and mahogany plywood, wood being used because of the fact that it is easier to shape and can readily be replaced in the event the wing tips are broken.

In the center section of the upper wing are the fuel tanks. Four hundred gallons of fuel can be carried, making possible a cruising range of six hours. The oil capacity is thirty-six gallons.

The fuselage is constructed of chrome-

molybdenum steel and dural tubing, which is purchased in round form and drawn square or rectangular in the Boeing machine shop to get shapes which are best suited for fabrication. The fuselage is covered with fabric, doped and finished with Berryloid for sheen and color. The ailerons and tail assembly surfaces are of heat-treated dural, which is corrugated.

High speed is 135 miles per hour. The ceiling is 15,500 feet, and the rate of climb 900 feet per minute. Landing speed is 55 miles per hour. The ship can take off in eleven seconds after a run of 750 feet.

The landing gear is the treadle type, with two Boeing oleo struts for each wheel. The tire is four feet, six inches in height. The wheels are equipped with Bendix brakes.

## GOODYEAR "DEFENDER"

**L**ATEST of the more than 100 airships built by the Goodyear-Zeppelin Corporation, the *Defender* carries two pilots, six passengers and two mechanics. Two Wright Whirlwind engines, of 165 horsepower each, provide power for the ship.

The new ship is much larger than the *Puritan* type, of which there are four. It is 177 feet long, 43 feet in diameter and is inflated with 160,000 cubic feet of non-inflammable helium, whereas the ships of the *Puritan* group are 128 feet long and 37 feet in diameter, with a gas capacity of 86,000 cubic feet.

The passenger compartment is upholstered in gray and blue velour. Chairs are wicker with mohair finish. The passenger compartment is 12 feet long and 6½ feet wide, with a 6-foot ceiling.

Wicker chairs, cushioned with leather, are provided for the pilots. In the rear of the cabin is a well-arranged lavatory.

Electric lights are a part of the cabin equipment. Large celluloid windows provide ample vision in nearly every direction. Woodwork is of mahogany plywood, dark walnut and stained with a piano finish.

The *Defender* has a range of 1,000 miles at one fueling. It has a gasoline capacity of 330 gallons, two tanks of 100 gallons and two of 65.

Portholes back of the mechanics' pit permit free circulation of air through the cabin,

lessening resistance to the craft's progress.

All compartments are equipped with fire extinguishers, and in case of an emergency, a safety discharge contrivance will release the entire fuel storage within a few moments.

The pilot room equipment includes a dual control system, enabling either pilot to operate the *Defender*.

In addition to the Goodyear Air Wheel, which increases the safety factor in landings and take-offs, the ship is equipped with a smaller wheel attached to the fin.

## NEW INDICATOR FOR ENGINE TEMPERATURE

**T**HE General Electric Company recently announced the development of a temperature indicator for aircraft engines for laboratory experimental work and for general service. This device is a cold-junction, temperature compensated instrument, consisting of a thermocouple with its leads and a remote indicating instrument calibrated to read engine heat. When mounted in the cylinder heads and walls of aircraft engines, it indicates the engine temperature at any desired remote point.

The instrument operates on the principle that a junction of two dissimilar metals, when heated, generates electric energy in proportion of the temperature.

## CATALOGS BY U. S. ELECTRIC TOOL CO.

**T**HREE catalogues were recently issued by the U. S. Electrical Tool Co., of Cincinnati, which show new additions to the line of tools produced by the concern. The innovations described include drills, grinders, sanders, snaggers, and wheel guards.

## STORAGE OF HELIUM GAS

**A**N interesting development is the new method of storing helium gas worked out by the A. O. Smith Corporation of Milwaukee, Wisc. This gas, so essential to the safe operation of our giant dirigibles is very costly, which, together with the fact that enormous quantities have to be accommodated, involves quite a problem for storage. The Goodyear-Zeppelin Corporation has awarded the contract for its Akron field storage to the Smith corporation.

Briefly, this system involves a battery of tanks 80 feet long and two feet in diameter. Two lengths of welded gas line pipe are joined and heads welded to the ends to make up each tank. Because of the high tension steel used and the efficient joints, it is thus possible to employ comparatively high operation pressure and consequently a favorable ratio between volume and weight.

For the Akron Zeppelin dock, it was desired to maintain a storage capacity of at least 1,000,000 cubic feet of dischargeable gas, which is approximately the volume of one cell for the new 6,500,000 cubic foot ships being built for the Navy. Ninety-six tanks will be supplied to take care of this storage. The tanks will be buried underground and suitably manifolded together in groups.

A similar contract was also placed with the A. O. Smith Corporation by the Bureau of Aeronautics, Navy Department, calling for fifty tanks of substantially the same dimensions to be installed at the Naval Air Station, Lakehurst, N. J. 320,000 cubic feet of dischargeable gas will thus be added to the present facilities there, in anticipation of the needs of the airships contracted for.



Views of the Goodyear "Defender", showing pilot's controls and passenger cabin

# Again, MOTH Victories Sweep Two Continents!



**At the Cleveland Air Races,** in three derbies and five closed course events, Gipsy Moths won:

**Four 1st places**

**Two 2d places**

**Two 3d places**

**One 4th place**

**Two 5th places**

*...And though the first American-built Moth was produced only last April, yet there were more Moths at the Cleveland Air Races than any other single commercial type of aircraft.*

Only standard Moth planes with NC numbers participated in these events, competing against a field of practically all special planes with NR numbers, licensed for racing only. This brilliant performance not duplicated by any other light airplane was an outstanding feature of the Cleveland Races.



## MOTH Wins Stunting Championship of the World?

A Gipsy Moth recently won the international aerobatic contest, against the leading high-powered planes of the world, at the International Aero Exhibition, held near London—convincing proof that Moth performance, sturdy strength, and responsive controls are equal to the severest demands of stunt flying.



## King's Cup Air Race another MOTH Triumph!

Moth again scored a sweeping victory at the King's Cup Race, 1169 miles around England. The final positions of the 15 finishing planes tells graphically the story of Moth performance and reliability.

Final Position	Make of Plane	Engine H. P.	Miles per Hour	Final Position	Make of Plane	Engine H. P.	Miles per Hour
1	Grebe	400	147.73	9	MOTH	100	100.84
2	MOTH	90	100.23	10	MOTH	100	100.81
3	MOTH	100	116.79	11	MOTH Coupe	100	99.52
4	MOTH	100	118.76	12	Avian	85	97.52
5	MOTH	100	105.12	13	Widgeon	85	97.47
6	Avian	110	111.18	14	MOTH Coupe	100	97.47
7	Grebe	400	142.26	15	Widgeon	85	98.90
8	Avian	90	99.66				



**International Victory!** In the International Light Plane Tour around Europe, just completed, a Gipsy Moth made the fastest time of all entries, and, in spite of its large handicap, came in second under the rules.

## MOTH AIRCRAFT CORPORATION, Lowell, Mass.

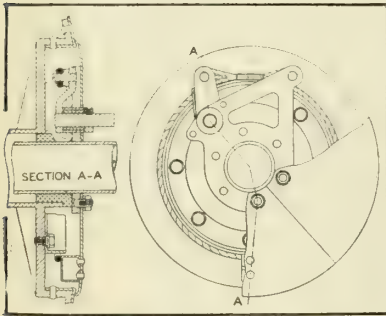
Demonstrations and full information may be obtained from Moth Distributors, or from 36 offices of Curtiss Flying Service, Inc. Address of nearest distributor will be mailed on request.



## THE WILHART WHEEL BRAKE

**PAUL H. WILKINSON** and **Frederick Gebhart** of Los Angeles, Calif., have collaborated in developing for aircraft use a new landing wheel brake, known as the Wilhart Airplane Brake.

The device consists of a small drum and a length of flexible stranded cable completely encircling the drum. The ends of the cable are spliced, one end being secured to a stationary bracket plate mounted on the axle, the other being attached to an operating arm pivoted thereon. A small movement of the operating arm brings the cable into contact with the drum, and an equalized concentric pressure is exerted on the periphery thereof. The points of attachment of the ends of the cable are misaligned to permit the latter to pass each other without interference, and a small guide at the bottom of the drum prevents lateral displacement of the cable. The drum is aligned with



Details of the Wilhart wheel brake

the wheel by means of depressions formed around the bolt holes which register with similar depressions in the wheel itself. A removable cover plate, made in two parts, is secured to the bracket plate by six nuts.

This brake is light in weight, and compact. It is of all-steel construction. The design allows for the lubrication of the friction elements, resulting in smooth action. The cable assembly is to standard airplane specifications and can be replaced at most any airport. The brake can be installed as an energizing or non-energizing type. The mechanism is said to be unaffected by water or dirt, and is thoroughly protected by the cover plate. It is necessary to remove only the upper part to inspect and service the brake without removing the wheel itself. Adjustment is accomplished by changing the position of the exterior operating lever.

## RECENT PATENTS

**T**HE following patents of interest to readers of *AERO DIGEST* recently were issued from the United States Patent Office. Copies thereof may be obtained from R. E. Burnham, patent and trade-mark attorney, Continental Trust Building, Washington, D. C., at the rate of 20c. each. State number of patent and name of inventor when ordering.

Rigid airship with separate gas-cells. Hugo Eckener, Friedrichshafen-on-the-Bodensee, Germany; assignor to Luftschiffbau Zeppelin Gesellschaft mit beschränkter Haftung, Friedrichshafen, Germany (No. 1,724,009).

Earth indicator compass galvanometer. Victor E. Showalter, Dayton, Ohio (No. 1,724,048).

Air speed and course indicator and recorder for aircraft. Robert H. Finley, New Haven, Conn. (No. 1,724,081).

Automatic stabilizer and brake for aeroplanes. Loyal Garriss, Center, Mich. (No. 1,724,188).

Flying-machine. Theodore Sorenson, Cleveland, Ohio (No. 1,724,226).

Rigid airship. Barnes N. Wallis and Charles D. Burney, Westminster, England; assignors to Airship Guarantee Co., Ltd., Westminster, England (No. 1,724,440).

Aerodynamic control of airplane wings. Louis H. Crook, Washington, D. C. (No. 1,724,456).

Airplane landing light. Harold A. Hicks, Detroit, Mich.; assignor to Ford Motor Co., Highland Park, Mich. (No. 1,724,482).

Apparatus for handling mail (with aircraft). George F. Myers, New York, N. Y. (No. 1,724,507).

Life-boat for aeroplanes. Lester V. Sircy, Los Angeles, Cal. (No. 1,724,622).

Amphibian flying-machine. Giovanni Ferruzzi, New York, N. Y. (No. 1,724,755).

Conveyer for dirigible hangars. Ralph P. Fox, Harrisburg, Pa. (No. 1,724,834).

Airplane. Leon Stein, San Francisco, Cal. (No. 1,724,859).

Airplane. George A. Morris, St. Louis, Mo. (No. 1,724,883).

Mooring means for airships. Ralph H. Upson, Detroit, Mich.; assignor to Aircraft Development Corporation, Detroit, Mich. (No. 1,724,890).

Wire end seal for aircraft. George A. Page, Jr., Freeport, and Frank H. Russell, Hempstead, N. Y.; assignors to Curtiss Aeroplane & Motor Co., Garden City, L. I., N. Y. (No. 1,724,959).

Helicopter. William Jackson, Draut, Mass. (No. 1,725,276).

Rotor craft. William J. H. Strong, Chicago, Ill. (No. 1,725,316).

Bomb-dropping and like release-gear for releasing suspended bodies and members under tension. Frederick H. Page, London, England; assignor to Handley-Page, Limited, London, England (No. 1,725,473).

Aeroplane. Adolph Schertz, Youngstown, Ohio (No. 1,725,481).

Propeller. Adolph Schertz, Youngstown, Ohio (No. 1,725,482).

Signal for airships. John P. Buckley and Arthur E. Nesbitt, Washington, D. C. (No. 1,725,563).

Automatic pilot. Elmer A. Sperry, Jr., Brooklyn, N. Y.; assignor to Sperry Gyroscope Co., Brooklyn, N. Y. (No. 1,725,599).

Automatic pilot. Elmer A. Sperry, Jr., Brooklyn, N. Y.; assignor to Sperry Gyroscope Co., Brooklyn, N. Y. (No. 1,725,600).

Combined altimeter and telemeter. Antoine Castellani, Paris France (No. 1,725,617).

Aeroplane. John J. Hill, Seattle, Wash. (No. 1,725,640).

Aeroplane. John H. Thomas, Denver, Colo. (No. 1,725,724).

Float for hydroplanes. Jean Van de Putte, St. Giles-Brussels, Belgium (No. 1,725,800).

Device for propelling aircraft at high altitudes by direct fluid reaction. Edison Hallowell, Horsforth, England (No. 1,725,914).

Airplane. Karl R. E. Badermann, Sagan, Germany (No. 1,725,950).

Dirigible aircraft. Clarence C. Gilman, Alhambra, Cal. (No. 1,726,062).

Method of and means for controlling aeroplanes. Frederick H. Page, London, England; assignor to Handley-Page Limited, London, England (No. 1,726,118).

Flying-machine. Morris Bernstein, Philadelphia, Pa. (No. 1,726,208).

Flying-machine with flapping wings. Karl Cerny, Herzogenburg, Austria (No. 1,726,342).

Seaplane-float. Boris V. Korvin-Kroukovsky, New York, N. Y.; assignor to Edo Aircraft Corporation, College Point, N. Y. (No. 1,726,439).

Aeroplane. Maurice H. Block, Brooklyn, N. Y. (No. 1,726,468).

Airplane. Randolph F. Hall, Ithaca, N. Y. (No. 1,726,558).

Inclination-indicator. Helge A. Borresen, Chicago, Ill. (No. 1,726,643).

Airship. Edward E. Moe, Omaha, Neb. (No. 1,726,754).

Aircraft-elevating means. Eugene Van Note, New York, N. Y. (No. 1,726,783).

Ornithopter. Felix Nanke, Walthamstow, England (No. 1,726,915).

Aircraft. Anthony H. G. Fokker, Amsterdam, Netherlands (No. 1,726,981).

Aircraft. Andrew A. Kucher, Chester, Pa. (No. 1,727,014).

Airplane-hangar. Theodor Ahlborn, Houston, Tex. (No. 1,727,022).

Aircraft. Roy W. James, Covina, Cal. (No. 1,727,033).

Aeroplane. Edward M. Burchell, San Jose, Cal. (No. 1,727,047).

Two-cycle airplane-engine. John W. Davis, Washington, D. C. (No. 1,727,051).

Landing-gear for aircraft. Frank H. Ordidge, Ruislip, and David L. H. Williams, Ickenham, England (No. 1,727,095).

Aeroplane safety device. Louis Blumenthal, Brooklyn, N. Y. (No. 1,727,157).

Method of operating a lighter-than-air dirigible. Frank B. Many, Cleveland, Ohio (No. 1,727,210).

Airplane-stabilizer. Federico G. Diago, Habana, Cuba (No. 1,727,275).

Parachute. Benjamin L. Elliott, Brown County, Ohio (No. 1,727,279).

Load-factor indicator for aircraft. Wolfgang Klemperer, Akron, Ohio (No. 1,727,210).

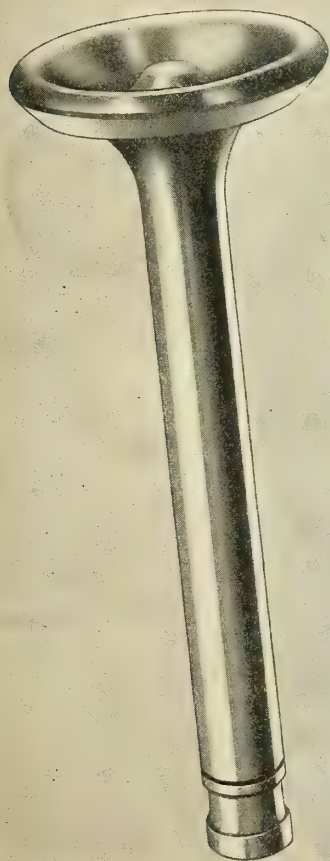
Fuselage. Edmund B. Carns, New York, N. Y. (No. 1,727,394).

Flying-machine. Joseph B. Strauss, Chicago, Ill. (No. 1,727,450).

Airplane construction. Albert C. Gienger, Chaloquin, Oreg. (No. 1,727,542).

Aircraft propelling and controlling means. Joel T. Rice, New York, N. Y. (No. 1,727,561).

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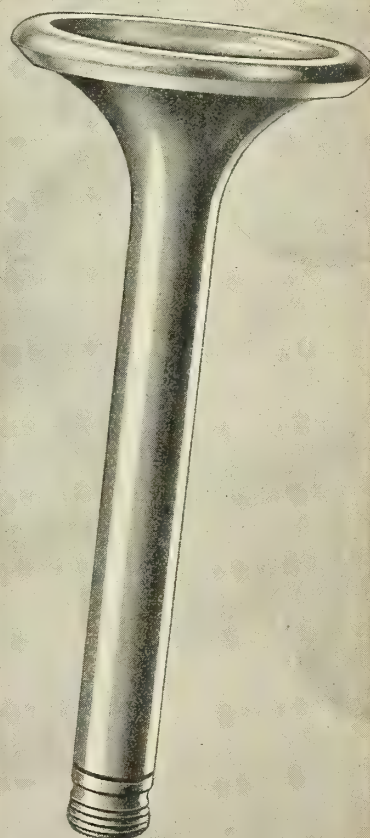


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# LIGHT AIRPLANES OF GERMANY

By

Edwin P. A. Heinze

THE economical conditions in Europe differ greatly from those in the United States in that the European standard of living is exceedingly low compared to the American. It is logical that aeronautical technical development should be influenced by these conditions. We find in Europe, for instance, in the motor car field, vehicles of a type that appears truly diminutive to the American sense of proportions. But these cars rather than the more pretentious large ones made in America, as of course, also in Europe, are the most popular type because they are low in price and maintenance and costs. Although not as powerful and fast as other cars, they serve their purpose and come within the purchasing limitations of a large proportion of Europe's middle class.

Similar economic conditions apply in the airplane field, and it is therefore not altogether surprising that the German aircraft industry is developing the light plane on an extensive scale.

Only such machines will be able to popularize flying in Germany, though, of course, there will always be a limited market for the great multi-engined ships. Particularly within the past year, notable progress has been made in Germany in the design of small airplanes. At present no fewer than ten good models of this class are being built.

The precursor of many of them is the Klemm, a type which is manufactured in the States by the Aeromarine-Klemm Cor-

poration of New York, and which has numerous remarkable achievements to its credit.

The Klemm, a low cantilever wing machine, built almost entirely of three-ply wood and having a high lift wing section, has a span of 42.6 feet and a wing surface of 215 square feet. Empty, it weighs 595 pounds. It is capable of carrying a load of 397 pounds which brings its gross weight loaded to 992 pounds. In spite of its low engine power, it is capable of a maximum speed of 72 miles per hour, whereas its cruising speed is 59 miles per hour. The Mercedes motor, with which the German ship is equipped, is of the two-cylinder horizontal air-cooled type. The tank will hold 40 litres of fuel permitting a cruising range of 340 miles. The wing loading is only 4.6 pounds per square foot, but the power loading is naturally very high, 49.6 pounds per horsepower. Notwithstanding the low engine power, the machine has a ceiling of 13,000 feet. It climbs slowly, however; it requires 18 minutes to reach 1,000 meters (3,280 feet).

There is in Germany an appalling lack of suitable motors for these machines. The only German motor for light planes is the Mercedes, just mentioned. But it is rather under powered; better types are those de-

veloping 35 to 50 horsepower such as the Anzani, A.B.C. Scorpion, or Salmson. In fact, all German light plane builders, including Klemm, offer their machines with these motors as optional to the purchaser.

A plane which is similar in appearance to the Klemm but of more recent design, is the B.F.W., which is built by the Bayerische-Flugzeug-Werke, which company also makes some very good passenger transports. The wings of the B.F.W. light plane can be folded. The span is only 38.7 feet and the wing area 155 square feet. The high lift wing is constructed of wood and is of the cantilever type. The wing structure employs a single spar and an auxiliary spar two-thirds of the chord from the leading edge. The wing surface is covered from the leading edge to the auxiliary spar, with plywood, the rest with fabric. The thickest section of the wings is at the fuselage where they are fastened with three bolts; like those of the Klemm, they taper toward the tips. A 34 horsepower A.B.C. Scorpion motor is installed in the standard model. Notwithstanding, the machine is lighter than the Klemm; it weighs only 441 pounds empty and can carry a load of 507 pounds. Gross weight is 948 pounds; also less than that of the Klemm. The high speed of the machine is 84 miles per hour, and the landing speed 43 miles per hour. The latter, however, is considerably higher than that of the Klemm. The wing loading of 6.1

(Continued on next page)



Typical German light planes: top, Mueller and Klemm; center, R.K. 25 and Espenlaub; bottom, the Czecho-Slovakian Avia B.H. 11, and the cheapest biplane, the R.K. 9, produced by Raab-Katzenstein



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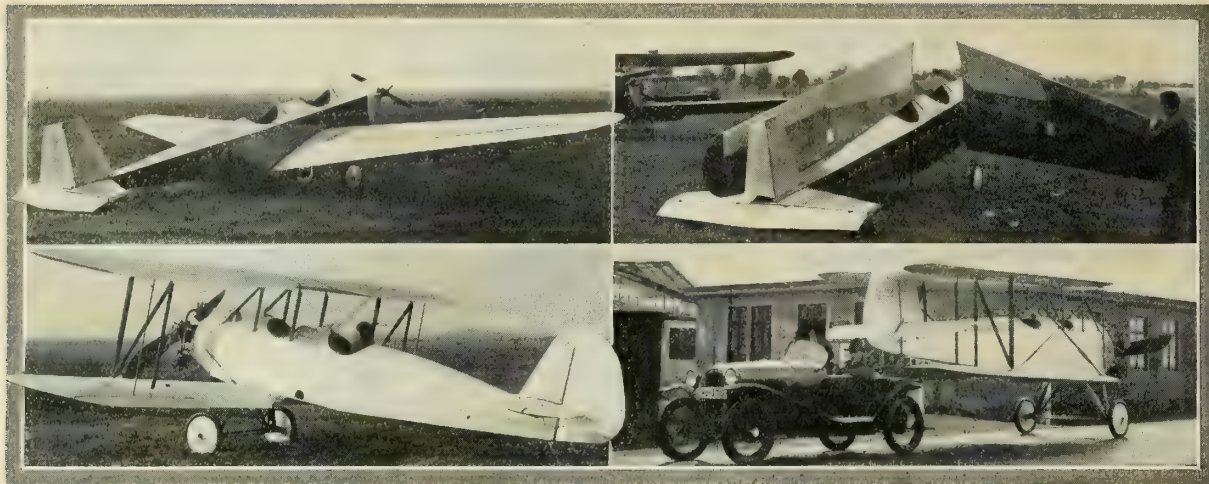
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The B.F.W. folding wing monoplane above and below it the Focke-Wulf S-24 "Kiebitz" biplane

(Continued from preceding page)

pounds per square foot, is also somewhat greater, though still very low when compared to the 11 pounds per square foot of the R.K. 25, to be described next. The B.F.W. requires 11 minutes to attain a height of 1,000 meters (3,280 feet). The fuselage structure is much the same as that of the Klemm; plywood covering entirely.

Both machines have two comfortably dimensioned cockpits equipped with dual control. All German light planes are similarly equipped.

Among the low-wing monoplanes of the light plane class is that recently introduced by Messrs. Raab and Katzenstein of Kassel, who usually specialize in building biplanes for a flying club in Essen. This ship, which is known as the R.K. 25, is capable of a top speed of 125 miles per hour, with an A.B.C. Cirrus 80 horsepower engine. Inasmuch as it is equipped with large fuel tanks, its cruising duration is about 15 hours. The wings have a span of only 30.5 feet and an area of 140 square feet. The fuselage is built up of welded tube sections and longerons, covered with silk to reduce the

weight. The wings are constructed somewhat like those of the other planes described, being partly covered with plywood. The rudders, ailerons, etc., are entirely of wood. This ship is also a two-seater. Because of the comparatively more powerful engine, the power loading is 19.3 pounds per horsepower as compared with 49.6 pounds for the Mercedes-Klemm and 23.83 pounds for the Scorpion-B.F.W.

Still another machine of this type, though not of German make, is the Avia B.H. 11 built at Prague in Czecho-Slovakia. The wings, however, are not of the cantilever type. Each wing is built up with two box spars, and from the leading edge to the rear spar, is covered with plywood, the remaining part with linen. The ribs are interconnected by longitudinal laths, and other interior bracing is entirely dispensed with. The thickest section of each wing lies one-third of its length away from the fuselage; it is at that point that the two faired steel struts are connected. At the other end these are fastened to the top of the fuselage, the rear one on each side being adjustable, thus permitting alteration of the angle of incidence.

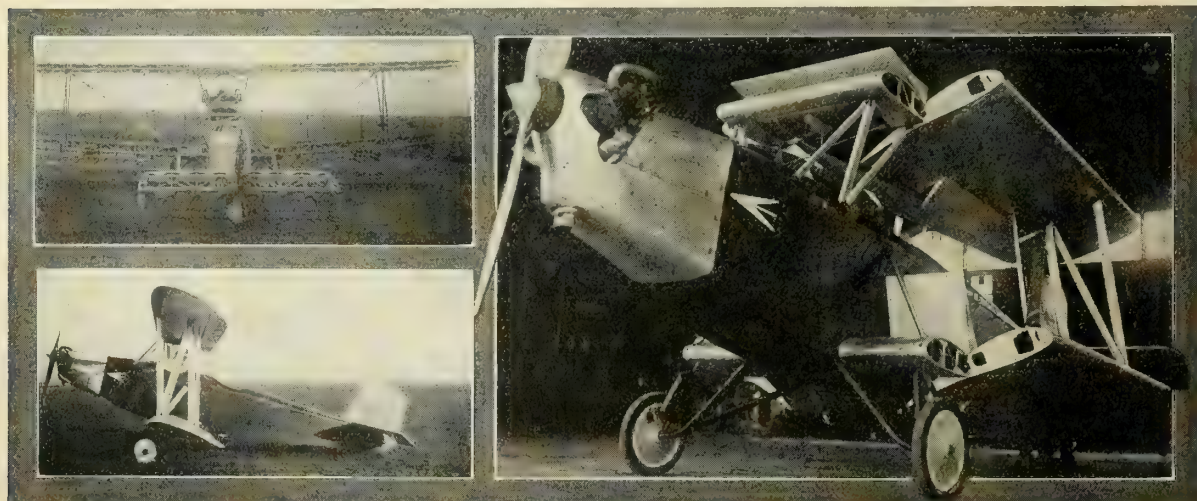
The ailerons, rudder, stabilizer and ele-

vator are of steel covered with fabric. The fuselage is square in cross-section, and is built up of four longerons, wooden trusses and plywood. The forward cockpit for the passenger is situated between the two main bulkheads. The engine mount is divided from the rest of the fuselage by a fire wall, which in this instance is covered with asbestos. The wings and the landing gear are attached to the two main bulkheads and lateral stresses of the wings are taken up by four steel belts. The span is 32.15 feet and the wing area 148 square feet. A 5-cylinder Walter radial engine developing 60 horsepower is employed, which gives the plane a maximum speed of 96 miles per hour. The machine, which has a ceiling of 8,200 feet, climbs to 3,280 feet in 8 minutes. The wing loading is 8.9 pounds per square foot. Loaded, the machine weighs 1,318 pounds. The weight empty is 805 pounds.

All planes thus far described have a slight dihedral and their lengths are between 21 and 22 feet, except the Klemm, which is 23.6 feet long.

A light plane of somewhat unusual design is a parasol monoplane evolved by the

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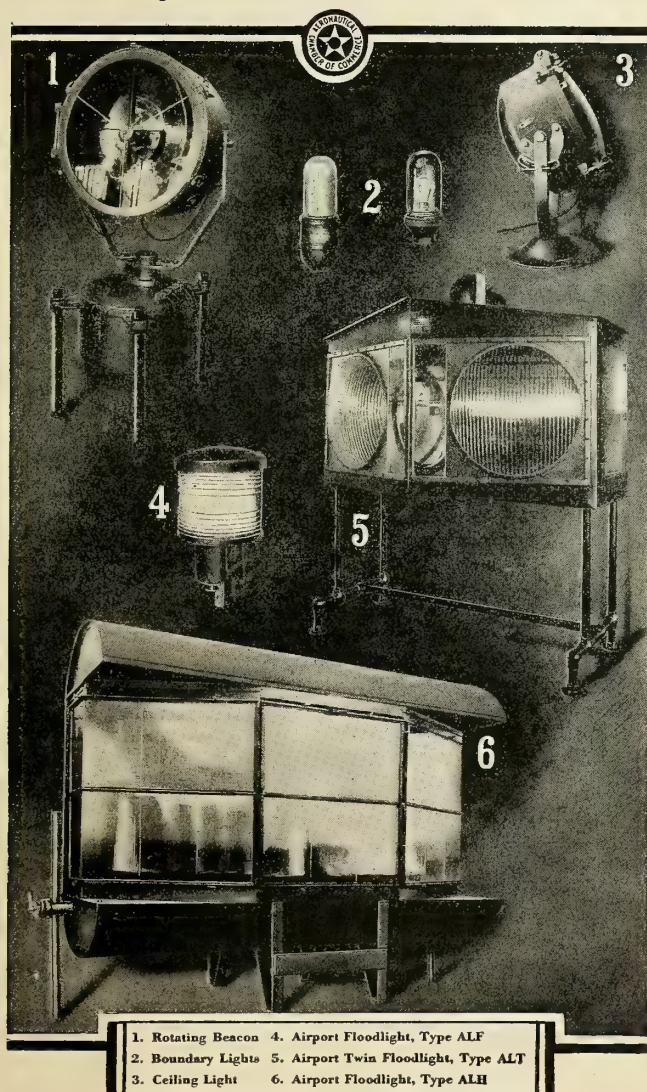


The skeleton framework, a side view and a detailed view of the Phoenix-Meteor biplane



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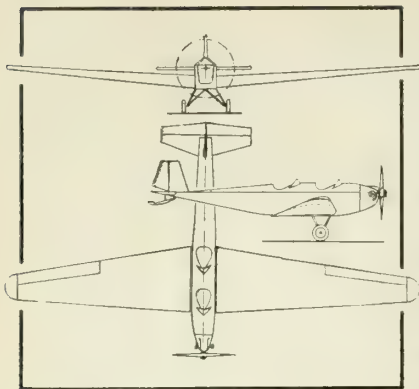
711-25

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The B.F.W. low-wing monoplane

*(Continued from preceding page)*

German sail flier Espenlaub. The wing has a span of 37.7 feet and an area of 172.23 square feet. It is held above the fuselage by four sets of two struts meeting at a point on the lower wing surface. The ship is powered with a 6-cylinder Anzani engine developing 50 horsepower, and its top speed is given as 93 miles per hour; its cruising speed is 81 miles per hour. A feature is the low landing speed of 28 miles per hour, made possible by a carefully designed wing, and a very low center of gravity. The climb is also interesting; it requires the ship 7 minutes to reach 3,280 feet, which is superseded only by the R.K. 25 with its more powerful engine. The fuselage is covered entirely with plywood and fabric. The weights of this machine are: empty, 661 pounds; pay load 881 pounds; gross weight, 1,543 pounds. Thus the wing loading is 9 pounds per square foot, and the power loading 34 pounds per horsepower.

Another remarkable little machine is that produced by the brothers Mueller of Griesheim. It is a high-wing monoplane with long faired struts bracing the wings to the fuselage. The latter is carefully streamlined and of plywood. The wings have a single spar and are covered with plywood up to this. The ship has a very low landing speed. The cockpits have lateral flaps that can be taken down to give easy access. A 3-cylinder Anzani motor of 35 horsepower is used, and the maximum speed obtained with it is 84 miles per hour; the cruising and landing speeds are 81 and

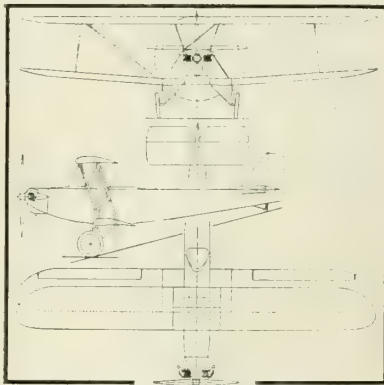
37 miles per hour, respectively. The span is 36 feet; the wing area, 172.23 square feet; and the weight empty, 606 pounds. The load capacity is 496 pounds; the total flying weight amounts to 1,102 pounds.

The wing loading is 6.4 pounds per square foot and power loading 31.5 pounds per horsepower. This machine climbs to 3,280 feet in 7.6 minutes.

One of the most interesting and unique German light planes is the new Junkers Junior, an all-metal low-wing monoplane, which was fully described in the September issue of *AERO DIGEST*.

These seven monoplanes have powerful rivals in the following biplanes, all of which are not only of latest design but are low in price. The prices of German light planes range from \$1,500 to \$2,000. They vary in each make according to the motor with which the machine is equipped.

The Focke-Wulf Kiebitz, a recent newcomer, has braced wings with equal span, a slight sweep back, and no stagger. The wings have no dihedral and can be folded back. They are constructed in three sections. An N-strut joins the wings at each side.



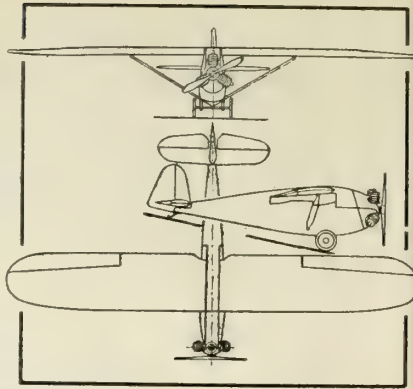
Phoenix-Meteor with A.B.C. engine

There are ailerons on all four wings. The wings are built up of one main and one auxiliary spar. Covering from the leading edge to the rear spar is plywood and hence internal bracing is dispensed with.

The fuselage consists of a welded tube frame, the rear portion of which is braced by wires and the forward with welded diagonal tubing. The wings have a span of 29.2 feet and a total area of 209.9 square feet. With a full load the ship weighs 1,290 pounds; empty weight is 805 pounds; and useful load, 485 pounds. The wing loading is 6.1 pounds per square foot. A Siemens S.H.13 radial engine, delivering 60 to 70 horsepower, is used. The ship has a maximum speed of 93 and a landing speed of 43 miles per hour. To attain an altitude of 3,280 feet the plane requires 8 minutes.

The Raab-Katzenstein-Werke last year placed a new small biplane on the market, which is designated Grasmuecke (Garden Warbler). This little machine rapidly became popular, for it was offered at an unusually low price, namely, \$1,300.

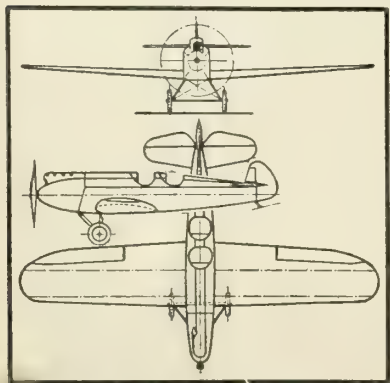
The wings are rectangular in plan, with rounded corners. The upper wing has a span of 29.4 feet, the lower of 26.4 feet.



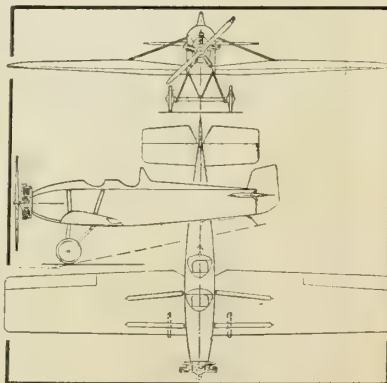
Mueller Brothers monoplane

Both are of one piece and of the cantilever type being joined at each side by N-struts. The wings are built up of wooden spars and ribs, braced by aluminum tubes and wires and covered from the leading edge to the main spar with plywood. The wings are staggered. Ailerons are on the upper wings only. The ailerons, rudder, fin, stabilizer and elevator are of wood, the bent edges being of aluminum, and are covered with fabric. The fuselage is of welded tubing, covered with fabric and braced with tube and wire. Equipped with a 3-cylinder Anzani engine, the plane weighs only 551 pounds, and has a loading capacity of 441 pounds. Thus its gross weight is 992 pounds and the wing loading only 4.7 pounds per square foot, lower than any of the others except the Klemm. The maximum speed is 74 miles per hour, the cruising speed 62 and the landing speed only 25 miles per hour.

Finally a short description must be given of the new little Phoenix Meteor plane. This little biplane has wings of equal span, with a slight dihedral. The span is 27.55 feet. The total wing area is 172.23 square feet. The wings, which are staggered, may be folded back and are of three-panel construction. They are built up of two spars, the leading edge being covered with plywood up to the front spar. The machine weighs empty 551 pounds and is capable of carrying a load of 463 pounds. The gross weight loaded is 1,014 pounds. The standard model is powered with an A.B.C. Scorpion engine and has a top speed of 80 miles per hour, the landing speed being 31 miles per hour.



The 80 h.p. R.K. 25 monoplane



Czecho-Slovakian Avia B.H. 11

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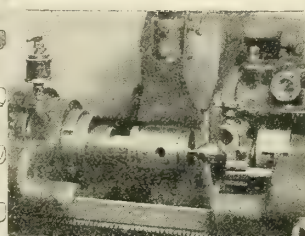
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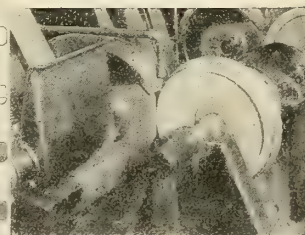
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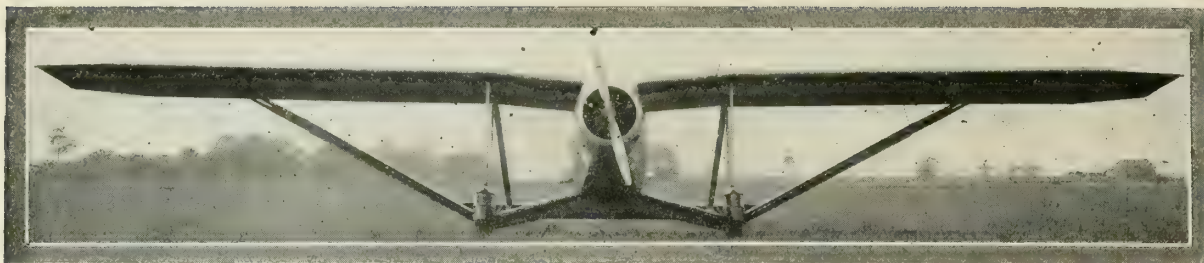
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## THE BELLANCA "TANDEM"

By Richard M. Mock

*Aeronautical Engineer,  
Bellanca Aircraft Corporation*

**P**RELIMINARY flight tests were completed recently on the Bellanca "Tandem", a radically new design of Guiseppe M. Bellanca, president and chief engineer of the Bellanca Aircraft Corporation of New Castle, Delaware.

S. J. Short took the plane up for its maiden trip and when he landed ten minutes later, after circling over the neighboring countryside and the outskirts of Wilmington, pronounced it excellent, except for some slight adjustments.

The plane left the ground after a short run and maneuvered in circles at an elevation of around 1,000 feet. Its landing speed was less than forty-five miles an hour, which was pronounced exceptional for a plane weighing approximately 7,000 pounds.

On the first model, the fuselage and inner portion of the wings are almost completely taken up with tanks, leaving just enough room for a comfortable cockpit for three people. Designs have been made for the plane as a double-deck passenger plane.

The ship is powered with two Pratt and Whitney Wasp engines of 400 horsepower each, mounted in tandem.

This airplane has in its fuselage two gasoline tanks, one of which is probably the largest ever built for an airplane; it has a capacity of approximately 1,500 gallons. In addition, there is in the rear a smaller tank holding about 230 gallons, and in front of the main tank are two oil tanks with a capacity of about 65 gallons each. In the wings are two gasoline tanks, one in each wing, also of large capacity, thus giving a total fuel capacity of over 1,800 gallons and an oil supply of 80 gallons. The Tandem weighs close to 7,000 pounds empty and is designed to lift a gross weight of approximately 20,000 pounds.

The lines of the ship were first conceived by Mr. Bellanca a number of years ago, but it was not until a year and a half ago that actual details were started. After about six months of preliminary study and investigations, detailed analysis and drawings were started, with construction beginning a month or so afterwards. The airplane is so radical in many of its details that it was necessary to resort to basic principles in carrying out almost every part of its structure.

The Bellanca Tandem was designed as a multi-motor airplane of great load-carrying capacity, yet retaining the efficiency and maneuverability of a single-engined airplane. The craft has a minimum of frontal area

with all exposed parts streamlined as well as possible. In this design it was decided to build a two-engine airplane, with the engines located in such a manner that there is no loss in efficiency should one engine stop. It was also desired to reduce the frontal area of the two engines to that of one. In addition, it was decided that there should be no load placed behind the pilot, so that in the event of a crash, the danger of the occupants is reduced to a minimum. The landing gear truss is combined with the wing structure, thus eliminating frontal area and allowing greater streamlining. The wing trussing is of the Bellanca type.

Perhaps the most interesting feature in the design of the Tandem is the engine installation. When the design was first laid out, there was considerable doubt as to whether the rear engine would keep cool. Ever since the plane was first conceived a few years ago, it was decided that the rear engine should receive its cooling air through a cowl of the general type which was later developed by the National Advisory Committee for Aeronautics. The forward engine is hooded over with an aluminum cowl and carries the air over the cylinder heads of the front engine, then backward to the cylinders of the rear engine. Though the air passing over the rear cylinder heads has absorbed a certain amount of heat of the forward engine, its velocity is increased by a set of deflectors resembling somewhat the inner ring deflectors developed by the N. A. C. A. for projecting the air on the cylinder heads. The aluminum cowl is fitted so that the engines are easily accessible. Like the installation on the Bellanca production models, the cowl folds upward similar to the hood on an automobile.

Ahrens controls are used throughout for the engine, because of the remoteness of the engines to the cockpit; the rear engine is about 12 feet from the pilot's instrument board.

The engine mount is as conventional as can be used for an installation as radical as this. The forward engine is mounted on a steel tube ring mount in the usual manner. This engine ring is braced to the fuselage by longitudinal members of heavy gauge steel and large diameter. In addition tie-rods are em-

ployed to increase the rigidity. However, the entire engine mount is a cantilever, which is readily detachable from the fuselage for repairs and changes in the installation.

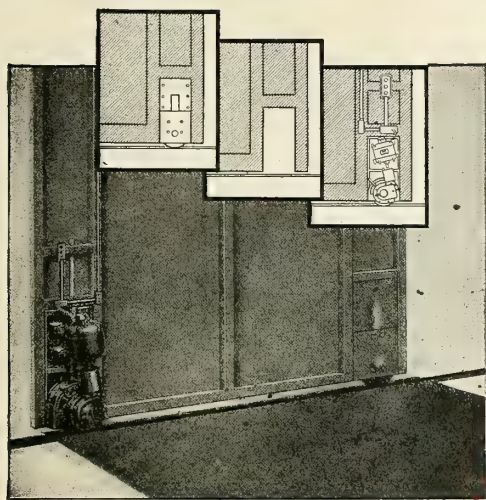
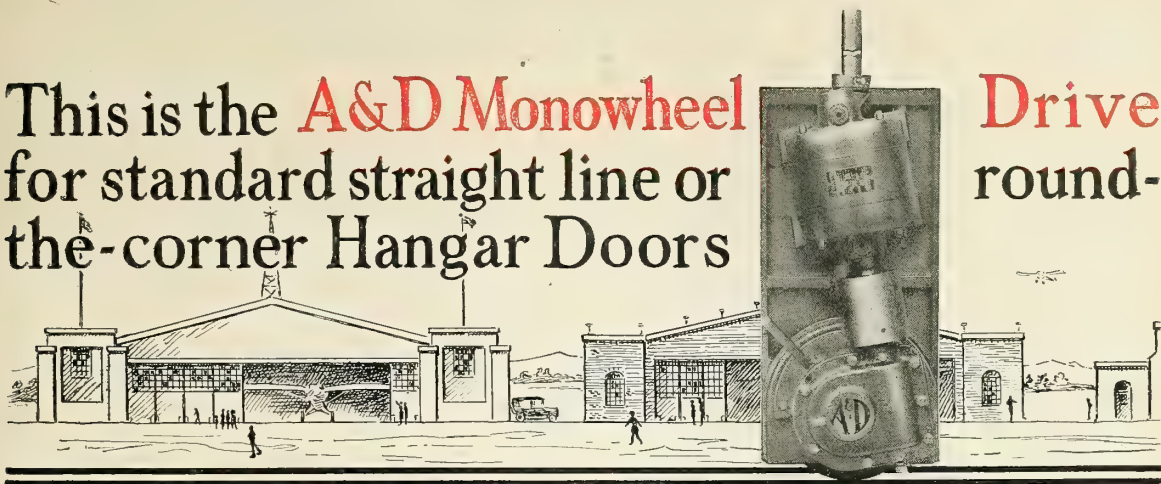
The detail of the engine installation which has excited the greatest amount of interest is the long steel shaft driving the rear propeller. The drive mechanism for the rear propeller is supported by bearings and fitted with couplings. The rear bearing is located at the rear of the fuselage, taking the thrust from the rear propeller and transmitting it directly to the fuselage, relieving the loads in the shaft. Before being installed in the plane, this drive shaft mechanism was subjected to a series of exhaustive tests as to its strength and balance. After the shaft was installed and before the installations in the fuselage were completed, the engines were tested on the ground for a considerable period to check over the reliability and serviceability of the complete installation, including the fuselage structure.

The fuselage structure is in itself quite unique. It is much higher than it is wide, to provide a double deck passenger plane and to give a large gap between the wings, tending to increased efficiency. The fuselage is faired so that a section through it at practically any point approaches a perfect streamline. The structure is a six-longeron construction, using chrome-molybdenum steel tubing welded by the oxy-acetylene process. The fuselage has a considerable number of cross bulkheads bracing it laterally, these having been located and installed so as not to complicate the tank installation or to encumber the pilot's cockpit. As mentioned before at the forward end of the fuselage, directly behind the engines are the two oil tanks. These tanks are fitted with an adjustable ventilation system to regulate the temperature of the engines. Behind the oil tanks is a fire wall separating them from the 1,500-gallon gasoline tank. This tank is of heavy welded aluminum sheet, with bulkheads to prevent the enormous weight of gasoline from swishing around during any maneuvers. The tank is divided vertically into two parts, each feeding a different engine, with provision that the gasoline on either side may be pumped into the other side, or dumped independently. Large dump valves are provided so that the entire gasoline load may be emptied in approximately one minute. The tanks may easily be closed so as to keep the airplane afloat should it land in water. This 1,500-

(Continued on next page)

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for standard straight line or  
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**Drive**  
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### A & D Monowheel Drive

For all standard sliding doors. Each unit is capable of serving an area of 1000 square feet. Consists of a double flanged roller, machined to fit a 12 or 16 pound rail. Operated by worm gear in leak-proof housing. Worm is keyed to shaft connecting with motor through special clutch and brake mechanism.

Complete power unit solidly mounted on plate designed to occupy swivel opening in standard hangar door. Provided with swivel on ball thrust bearings for round-the-corner doors, or bolted securely to door framework for straight line installations.

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Open and close the  
Hangar doors at the  
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In cold or stormy weather it pays to get the doors opened and closed again *pronto*.

With this equipment you just press a button and the door moves, forward or backward. As shown at the left, it is designed to fit the swivel opening in standard hangar doors. One unit can handle a single round-the-corner entrance 80 ft. wide. The control buttons may be mounted on the panel, or at any point in hangar or office.

Write us for full information. We can motorize your hangar doors, no matter what size or type they may be.



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(Continued from preceding page)

gallon tank extends backward to the pilot's instrument board and occupies the complete cross-section of the fuselage, having a hole through its center to accommodate the propeller drive shaft. The pilot and co-pilot are located behind the main gasoline tank and above the drive shaft. Below them is an auxiliary tank of 230-gallon capacity. Behind the pilots and this auxiliary tank is a deep compartment for the radio operator. In the roof of the fuselage is an opening for the co-pilot or navigator to make celestial observations.

Provision has been made to convert the Tandem into a large passenger transport. It was originally designed as a double-deck passenger plane, with passengers on both upper and lower decks, or with passengers above and freight below. The layout calls for the same type of wing tanks as are used at present, with a baggage compartment behind the engines on the lower deck and the pilot above. Behind is the commodious passenger compartment, at the rear of which is a separate compartment both above and below. The upper one provides for a steward, below is the lavatory.

The Bellanca type of wing bracing has been somewhat modified from that used in the *Roma*, in that it is simpler. The bracing is of the two-bay type with the inner bay very much like that of the conventional monoplane, with a negative dihedral for the lower wing and positive dihedral for the upper. The outer bay resembles a braced-wing monoplane, except that the supporting strut is of the usual Bellanca type having a lift section and forming a wing with fore and aft struts acting as spars. Unlike that of the *Roma*, this wing, which is called the auxiliary wing, is of constant chord and thickness.

The outer, upper panel is of conventional construction, employing the usual Bellanca airfoil. It has routed wooden spars, wood

ribs and fabric covering, doped and pigmented in the usual manner. The wing is exceptionally deep, thus affording a deep drag truss making for a rigid wing. The aileron extends the entire span of this outer, upper panel. The auxiliary wing is also of wood construction similar to the upper wing. One of its most interesting features is that the auxiliary wing does not extend fully to the upper wing, and that the spars continue to the upper wing spars acting as struts. They are streamlined with Balsa Wood and covered with fabric. Because of the fact that the chord of the auxiliary wing is considerably less than that of the upper wing, it is necessary for these spars to diverge from the auxiliary wing to the upper wing attachment points. These bends are obtained in a special manner developed by the Bellanca Aircraft Corporation. The spars are continuous through the bend and have great rigidity against bending due to lift loads.

The inner bay of the wings actually forms the landing gear truss. The wheels are housed partly within the wing structure and faired into it. The front spar of the auxiliary wing is pinned to the axle of the wheel, which is mounted rigidly to the front spar of the lower wing of the inner bay. Shock is absorbed by special 44 by 12 tires, set almost 18 feet apart. The direct landing loads are carried through an N-strut to the upper wing and by heavy tie-rods attached to the fuselage. The lower wing of this inner bay is tapered, both in plan form and thickness ratio, in such a manner that the spars are of constant depth and section throughout their span. The upper wing of the inner bay has the same airfoil as the outer bay upper wing. The inner bay wing is peculiar in that it has a special type of welded aluminum tank for this type of plane.

The tail surfaces are supported by four built-up wooden beams attached to the wings at the N-strut. In plan view the outriggers are parallel; in side view the lower outrigger

is parallel to the ground, while the upper outrigger comes to meet it at a point below the stabilizer. On the ground these outriggers appear to have a peculiar section, but in flying position a section parallel to the thrust describes an efficient streamline form. Both outriggers are of the hollow box type with the lower one faired with Balsa Wood, and the upper one streamlined with ribs similar to a wing with plywood cover. The outriggers are braced laterally by heavy cables in the plane of the lower two members.

At the rear end of each pair of outriggers is mounted a tail skid fitted with an Oleo shock absorber.

The horizontal tail surfaces have an exceptionally high aspect ratio, since the span is more than that of the inner bay of the main wing. The area of this horizontal tail exceeds that of the average light airplane. Both vertical and horizontal tails are of wood construction similar to that used in the main wing. There is a single rudder mounted in the center of the stabilizer and having an overhang balance similar to that on the elevator. The fin is supported to the stabilizer by means of streamline tie-rods.

The controls are all actuated by means of cables working over ballbearing pulleys to a special type of duralumin horn. The elevator and rudder cables run through the upper outriggers. They come through the upper wing from the cockpit where they are actuated by the usual type of control system, differing from the conventional only in that the column for the wheel control is supported from the roof of the cabin. Dual control is provided with a single wheel being swung in front of either seat. The rudder pedals are of the usual type, with brake levers located on the pedals on the left side only. Throttle controls are situated between the pilot seats above the main shaft which is enclosed in a duralumin housing. Fuel system controls are on the right-hand side of the cabin and the dump valve levers are located on each side of the instrument board.

The instrument panel is mounted vertically with the instruments arranged in an efficient manner for blind flying. To provide against failure, two earth inductor compass indicators are mounted in parallel at the top of the instrument board.

The instrument lay-out was designed by Shirley J. Short, winner of the Harmon Trophy, who assisted in supervising the construction of the Bellanca Tandem as representative of the *Chicago Daily News*, for whom the airplane was built.

#### Specifications

Span overall	83 feet 2 inches
Chord, upper wing	9 feet 6 inches
Tread of landing gear	17 feet 10 inches
Height overall	12 feet 9 inches
Length overall	44 feet 2 inches
Total wing area	912 square feet
Weight empty	7,000 pounds
Gross weight loaded	18,000-20,000 pounds
High speed	140 miles per hour
Cruising speed	120 miles per hour
Cruising radius	6,000 miles
Flight duration	100 hours



The Bellanca tandem-engined sesquiplane

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# LOENING XO-10 MILITARY AMPHIBION

**T**HE Loening XO-10 two-seated amphibion was designed for the United States Army Air Corps as an experimental observation plane to incorporate the one-wheel retractable landing gear and to service test the new Wright Typhoon engine. The XO-10 was test flown by Lieut. Julian B. Hadden, of the Test Division, Wright Field, and was accepted by the Air Corps.

The hull is of all-duralumin structure. Strength members are of specially designed extruded duralumin sections with Alclad dural covering bolted to the structure. The pilot's cockpit, which is well forward, was designed particularly for maximum visibility and comfort. The observer's cockpit is equipped with the standard Lewis machine gun ring. This cockpit has a folding seat for use when the occupant is operating the auxiliary control or the radio spotting set. A large photographic hatch is installed in the bottom so that the tri-lense (T-2) mapping camera may be used. A water-tight plug seals this opening when landing on the water.

The empennage is of standard Loening construction. The stabilizer is adjustable in flight from the pilot's cockpit by means of torque tubes and bevel gears.

The biplane wings are of the two-bay, wire-braced type, without a center section. Their construction is similar to that of other Loening planes.

The one-wheel landing gear operates vertically in a water-tight box similar to a center-board box on a sail boat. The 40 by 10 inch wheel is retracted by a worm gear

cranked by the pilot. Two small doors, positively operated, close the hole in the bottom when the wheel is in the retracted position. Lateral balance is provided by skids on the wing tip floats. The tail skid is the standard Loening skid with rubber disk shock absorbers.

The plane handles very well in the air, and is able to taxi in any direction on both land and water. Its characteristics on water are no different from those of other Loenings. On land, it stays on nearly an even keel, because of the long wing skids, each of which has a small wheel at its tip. Taking off on land, the plane rides on the main wheel, and on one skid or the other until a speed of about 25-30 miles per hour is reached, after which it rides and takes off from its single wheel. The one wheel eliminates a quantity of external bracing and resistance, and is said to reduce the danger of damaging the plane when the pilot forgets to retract his wheel before landing on the water.

The power plant is the new Wright Typhoon, an inverted 12-cylinder air-cooled

Vee type. This engine develops 500 horsepower at 2,000 revolutions per minute. Because of its inverted position and small frontal area, the engine provides excellent visibility for the pilot. It is almost completely cowled in, and thus adds greatly to the plane's performance.

The gas capacity is 140 gallons, and the oil capacity is 12 gallons. The plane is equipped with a two-blade 10-foot Standard Steel propeller and Eclipse electric inertia starter.

Performance figures are not available until released by the Air Corps, but below are listed the general dimensions and weights.

## Specifications

Span .....	46 feet 3 inches
Length .....	35 feet
Height .....	12 feet 11 inches
Chord .....	6 feet
Wing area.....	494 square feet
Weight (net) .....	3,200 pounds
Useful load.....	1,900 pounds
Gross weight loaded.....	5,100 pounds
Wing loading....	10.3 pounds per square foot
Power loading....	10.6 pounds per horsepower

## NON-FOGGING GOGGLE

**A** NEW aviation goggle which will not fog under the most trying atmospheric conditions and will not cause goggle headache, has been developed by the American Optical Company.

There are two separate rubber cushions in the goggle, which can be removed and replaced and which fit closely to the contour of the face, but do not interfere with nose breathing. The distance between lenses is adjusted without tools with a ratchet locking device. All parts are replaceable and interchangeable, because the goggle is built to micrometric specifications. On the down curve of each eye-cup is located a tube

which catches the slipstream, no matter what the angle of the flier's head or direction of the slipstream. As the air passes through this tube, it creates a suction behind the lens, and ventilating air is drawn up through intake valves at the bottom of the eye-cup forming a constant ventilation behind the lens so that it will not fog. At the same time, the openings are staggered so that no direct air "shots" or "needles" reach the face regardless of the speed of plane or velocity of slipstream.

The lens computations were developed by Dr. E. D. Tillyer, chief of the scientific staff of the American Optical Company. American Transport lenses are decentered so that the optical center is moved to a position in direct line with the straight-ahead line of vision. This lens is supplied in white glass or in Calobar glass—the latter a glare-proof tinted glass which does not alter color values.

## DRY GLUE AVAILABLE IN SMALL PACKAGES

**T**HE Casein Manufacturing Company of America, Inc., the manufacturer of Casco Waterproof Glue, is now distributing, through dealers, a new package of this product in half and one-pound cans, and five and ten-pound bags. Casco is an all-glue dry powder. It contains no preservatives to reduce its efficiency and is not affected by moisture or atmospheric changes. It is easily and quickly mixed by adding cold water and stirring, no heat being required. Casco is mixed cold and used cold on lumber and therefore cannot chill before pressure is applied.

There is no necessity of heating stock before gluing or of maintaining a sufficiently high temperature in a shop to prevent hot glue from chilling before pressure is applied. High moisture content of lumber is said not to lessen its efficiency.

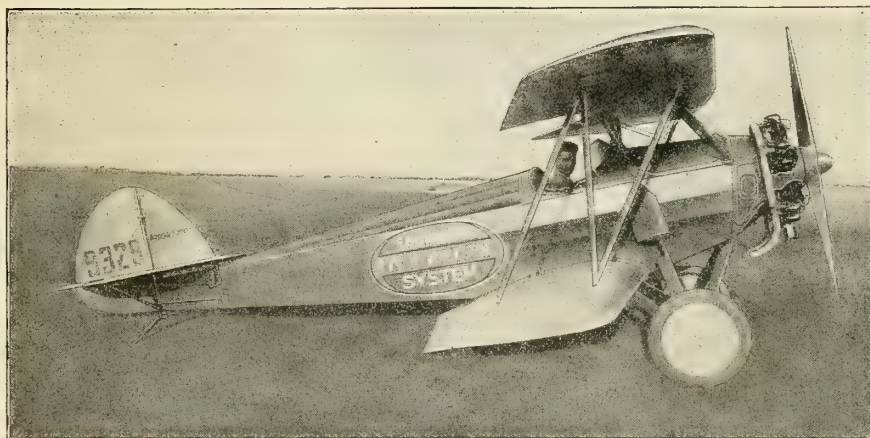


The single-wheel Keystone Loening Amphibion afloat and ashore

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The Arrow Sport won the distinction of pioneering in this field only after exhaustive surveys had proved that Arrow performance, flying ease and rugged construction made it the logical choice for the severe requirements of Fly-It-Yourself service.

ARROW AIRCRAFT AND MOTORS CORPORATION  
*Havelock, Nebraska*







## FOKKER F-32 MONOPLANE

**T**HE Fokker F-32, latest and largest creation of the Fokker Aircraft Corporation of America, now affiliated with the General Motors Corporation, carries 30 passengers in day flights and sleeps 16 in luxurious comfort in transcontinental night flights. Five of the great new ships have already been ordered by Universal Aviation Corporation for use in its transcontinental services. It is reported that the first ship will be used on the New York Central's air-rail hook up between Cleveland, Ohio and Garden City, Kansas.

The ship was designed for a top speed of 140 miles per hour, a cruising speed of 120 miles per hour, and a landing speed of 60 miles per hour. In every particular the F-32 surpassed the performance for which it was designed.

Lt. Harry Johnson, Chief of the Army Engineering Test Branch at Wright Field, Dayton, Ohio, one of the foremost test pilots of America, was at the controls of the F-32 in its debut. James T. King, pilot of the Western Air Express, which has ordered several of the great ships for use on the Pacific Coast, was co-pilot.

Running at full throttle, the F-32 made 157 miles per hour air speed—17 miles an hour above the performance for which it was designed.

The ship cruised at between 120 and 125 miles per hour. Despite its huge size, Lt. Johnson was able to set the F-32 down at 47 miles per hour, 13 miles an hour slower than the landing speed which the designers had promised.

The first public flights were made under

the most adverse weather conditions. A drizzling rain was falling when the ship took off for the first time, and throughout its trial flights. A heavy fog surrounded the field and visibility ended at a quarter mile. The ceiling was 700 feet or less.

An enthusiastic group of aviation writers, including a representative from *AERO DIGEST*, technical experts and aviation officials watched the tests and made flights in the new ship.

Mr. Fokker said:

"We have designed this ship for great automatic stability for use on transcontinental night flights. The controls are designed so that under the worst weather conditions one pilot can control direction and the co-pilot can control altitude. This is our first ship with four motors, which increases the factor of safety and the economy of pay load operation. The F-32 can fly and even climb with only two motors. We are particularly pleased with the ratio between the top speed and the landing speed. For the first time in a large ship this ratio is better than three to one, the F-32 flying at 157 miles per hour top speed and landing at 47 miles per hour."

The F-32 also operated on its two starboard motors alone, and on its two port motors alone, and was able to turn with or against the motors. With a two-thirds load, it was able to hold its flying speed and even gain altitude on one motor alone.

The big ship, which has a span of 99 feet, an overall length of 69 feet 10 inches, an overall height of 16 feet 6 inches, and a wing area of 1,350 square feet, is powered with four 525 horsepower Pratt & Whitney "Hornet" engines. The engines are carried in tandem, two on each nacelle, the nacelles being located on either side of the fuselage.

The front engines have two bladed adjustable Standard Steel propellers and the rear engines three bladed adjustable propellers.

The F-32 has a rate of climb of 1,200 feet the first minute, and a service ceiling of 18,000 feet.

The weight of the plane empty is 13,800 pounds. It has a total useful load of 8,700 pounds, giving it a gross weight of 22,500 pounds or 11¼ tons.

It carries 400 gallons of fuel, 40 gallons of oil, a crew of pilot, co-pilot, radio opera-

(Continued on next page)



Views showing tandem arrangement of engines on the F-32





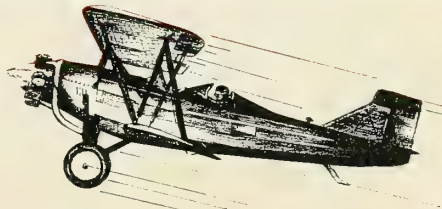
LEFT:—Perfect Flying Country  
Around Phoenix



BELOW:—Dining Room, Hotel  
Westward Ho

## WINTER FLYING WHERE WINTER NEVER COMES - -

**S**ITUATED amid the scenic beauties of the Great Southwest, Phoenix Sky Harbor is virtually surrounded by every variety of terrain under the sky. Here the student will find the opportunity to fly over flat table land . . . lofty mountain peaks . . . deserts as far as the eye can see . . . thriving cities. The best cross-country training to be had—right at your “door step”; and cross-country experience is the biggest asset a pilot can offer his employer. ¶ You lose no time at Phoenix Sky Harbor because of bad weather. Flying weather is so *consistently* fine here that we guarantee to instruct you **FREE** every day the sun does not shine. ¶ All aviation activities are located right on the field. Instructors with thousands of hours to their credit teach you elementary, advanced and cross-country flying in the latest open and closed planes. Ground courses include engine mechanics, ignition and carburetion; aircraft design, construction and overhaul; aerodynamics and theory of flight; navigation and meteorology; in short, everything related to aviation that the Department of Commerce requires. ¶ Arizona’s climate is matchless—its people hospitable. Living costs are low and opportunities in the West are multiplying each day. ¶ Write **NOW** for further information regarding Arizona and Phoenix Sky Harbor.



### GRAND CANYON FLYING BRIDGE

Daily flights between North and South Rim Airports, connecting the Union Pacific and Santa Fe Railroad—Fred Harvey Services. Daily scenic tours over the Grand Canyon, Painted Desert, Little Colorado, National Forests.

(TRIMOTORED FORD PLANES)  
SCENIC AIRWAYS, INC.

### PHOENIX

## SKY HARBOR

Address

SCENIC AIRWAYS, Inc.

SKY HARBOR

PHOENIX, ARIZONA



(Continued from preceding page)

tor and steward, and 30 passengers in day time flight, with provisions for 560 pounds of baggage.

As a night plane, it carries 700 gallons of fuel, 60 gallons of oil, a crew of five, and 16 passengers, with provision for 820 pounds of baggage.

Its range as a day plane is 480 miles and as a night plane 850 miles.

The F-32 is of standard Fokker design, with all wood veneer covered wing of full cantilever type. As in all Fokker ships, the fuselage tail surfaces and landing gear are of tubular steel construction.

Its spacious cabin is divided into four sections, the interiors of which are finished in mahogany and light pile fabric. Each section has four glass windows. The interior is fitted with 30 comfortable armchairs with deep cushions, adjustable backs, and head

rest. The cabin has two fully equipped lavatories. It has two galleys, or serving pantries, amidships, and a baggage compartment forward.

Its cockpit, located in the nose of the ship, is of the enclosed type, accessible from the cabin by a pair of swinging doors. It also has a bottom door entrance from the outside. The cockpit contains 2 pilots' seats. The radio compartment is located below the pilot's cockpit.

The F-32 has dual wheel control, adjustable stabilizer, and brake controls acting independently on each wheel for aid in steering although both brakes may be set for engine testing and for parking.

Two metal instrument boards, electrically lighted, in front of the pilots' seats, hold four electric tachometers indicating the revolutions per minute of the four motors; 4 ignition switches; a master ignition

switch; a clock, altimeter, bank and turn indicator, air speed indicator and magnetic compass. A mechanic's instrument board is placed back of the pilots' seats. It holds 4 oil pressure gauges; 4 oil thermometers; 4 gasoline pressure gauges; a booster magneto selector switch; and the fuel cock system. Two landing lights, of the retractable type are located in the wing.

The ship's four aluminum gasoline tanks of total capacity of 700 gallons are placed between the wing spars with visible gasoline level gauge glasses. Four 15 gallon oil tanks are placed in the nacelles, one double tank in each nacelle.

The landing gear which is 20 feet wide is of the divided type, with axles hinged to the bottom of the fuselage. Its roller bearing wheels with internal expanding brakes are fitted with 58 by 14 inch Goodrich tires. Two type CV-57 AeroI shock absorber struts are used on the landing gear.

## FOKKER HIGH WING MAIL PLANE

**A**NTHONY H. G. FOKKER'S newest single motor design, the Fokker F-14 Mail Plane, made its first public appearance at Cleveland Airport during the National Air Races. Orders for six of the new F-14s have been received from the Western Air Express and ten from Western Canada Airways, Ltd. It is a pay load ship, with a high speed of 140 miles per hour, and of parasol construction for maximum visibility. Preliminary tests of this monoplane showed that it will lift a pay load of 1,600 pounds in 9 seconds.

The parasol wing construction is a departure from recent Fokker designs. The full cantilever type wing, entirely covered with wood veneer, is raised from the fuselage to give unobstructed vision to the pilot, whose cockpit is aft of the cabin.

The new F-14 is powered with either a Pratt and Whitney Hornet or a Wright Cyclone, both of which are 525 horsepower engines. It has an adjustable pitch propeller, electric inertia starter and booster magneto. The ship has a high speed of 140 miles per hour, a cruising speed of 115 miles per hour, and a landing speed of 55 miles

per hour. It climbs to 1,200 feet the first minute and has a service ceiling of 18,000 feet.

Its two gasoline tanks located between the wing spars have a total capacity of 180 gallons. Two King Seeley gasoline gauges are located on the instrument board. It has an 18-gallon oil tank. The cruising range is 800 miles.

Its cockpit is of the open type, located behind the mail compartment, and contains a single pilot's seat with safety belt. The instrument board is illuminated and has a magnetic compass, altimeter, air speed indicator, tachometer, clock, bank and turn indicator, oil pressure gauge, rate of climb indicator, oil thermometer and magneto switch.

Like all Fokker planes, the fuselage, tail surfaces and landing gear are of tubular steel construction. The landing gear is of the divided type, with axles and axle bases hinged to the bottom longerons. It has oleo-pneumatic shock absorbers and wheels fitted with 36 by 8 inch tires and internally expanding brakes. The wheel has a 14 by 3 inch tire. Brake controls act independently

on each wheel for aid in steering when taxiing, but both brakes may be set for parking or engine testing.

The nose cowls have adjustable shutters for departure control operated from the cockpit.

The sides and floor of the cabin are finished with corrugated aluminum. The cabin has non-shatterable side glass windows. Although designed for mail transportation with no seats installed, the cabin may be fitted with six seats.

### Specifications

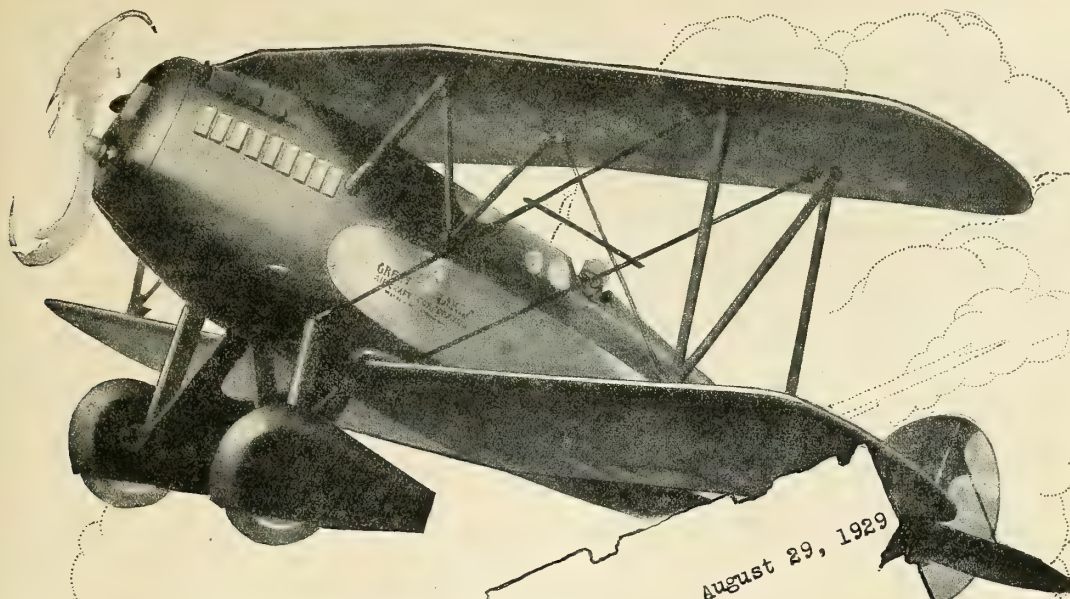
Span .....	59 feet
Length overall .....	43 feet 4 inches
Height overall .....	12 feet 11 inches
Wing area .....	550 square feet
Gasoline capacity .....	180 gallons
Oil capacity .....	18 gallons

### Performances

High speed .....	140 miles per hour
Cruising speed .....	115 miles per hour
Landing speed .....	55 miles per hour
Climb .....	1,200 first minute
Service ceiling .....	18,000 feet
Cruising radius .....	800 miles



The new Fokker F-14 mail plane which affords the pilot exceptionally good visibility



August 29, 1929

American Cirrus Engines, Inc.  
Belleville, New Jersey.

Gentlemen:

Congratulations!

If I had the ability to fly the Great Lakes Trainer as efficiently as the American Cirrus Motor performed, I am sure I would have won the Miami-Cleveland Race.

You may be interested to know that the American Cirrus was turning 2125 R. P. M. wide open the entire way and I want to congratulate you on its reliability.

Yours very truly

*Bert Hassell*  
Bert Hassell.

**1483 miles** at Full Throttle. Two stock Great Lakes Trainers, one of which carried mechanic and seventy-five pounds of spare parts and baggage, a total load of 600 pounds including pilot, flew in the Miami-to-Cleveland Derby, and finished second and fourth respectively.



**AMERICAN CIRRUS ENGINES, INC.**

WASHINGTON AVENUE, BELLEVILLE, N. J.





## AERONCA C-2 MONOPLANE

**A**FTER four hundred hours of flight tests, the Aeronautical Corporation of America, Cincinnati, O., has begun production on the Aeronca C-2, a new and unusual monoplane of the light plane class. The ship is quite different in appearance and is said to have excellent performance characteristics.

The Aeronca C-2 was designed by Jean A. Roche, former Senior Aeronautical Engineer in charge of specification and development for the engineering section of the United States Army Air Corps. While in the Army Air Corps, Roche designed four observation, one combat and one training plane that were built and performed satisfactorily. Previous to this army assignment Roche had designed and built many other planes, all of which performed well.

Though having the position of president of the Aeronautical Corporation of America, Roche is still retained by the Army Air Corps as consulting engineer for all government contractors who supply airplanes to the Army air service.

Roche designed the Aeronca C-2 as an economical plane to be used by students and sportsmen. According to the manufacturer, the plane can be flown between 160 and 190 miles on five gallons of gasoline, or about 35 miles to the gallon.

Powered with a 35 horsepower, two-cylinder motor of Roche's own design, the Aeronca has a top speed of 82 miles per hour and a cruising speed of 63 miles per hour. The plane takes off in five seconds. It has an angle of climb exceeding 14 degrees, and length of run of about 130 feet.

The weight of the plane is 400 pounds. With baggage and two occupants, the Aeronca has a total weight of between 700 and 800 pounds. When the ship is thus loaded, its take-off time is 12 seconds with a run of approximately 300 feet in still air. The wing loading is approximately 6½ pounds per square foot. This permits a low landing speed of about 32 miles per hour.

Two interesting features of the Aeronca C-2 are its unusual wing arrangement and the reduction of parasitic resistance of the landing gear. The latter feature has greatly increased its flying speed and places the fuselage in taxiing so low to the ground that the pilot can actually touch the axle of the wheels. All the elements of the landing gear, excepting the wheels, are contained within the fuselage. It is claimed that this arrangement not only reduces weight and head resistance, but permits sharp turns while taxiing. The irregularities of the ground are said to have little effect on the lateral balance of the plane.

The wing structure is a single-bay, externally wire-braced, high-wing monoplane. The flying wires are duplicated, so that the front or rear fittings and several pairs of wires may fail without resulting in a collapse of the truss.

The fuselage is of steel tube construction. The cockpit is directly below the wing. Celluloid doors are provided to form a cabin and increase the comfort in cold or wet weather.

Major Brower, in his official test flights, put it into right and left spins and pulled it out by neutralizing the controls. With two

men, the plane has reached an altitude of over 16,000 feet. Its theoretical ceiling is 21,000 feet.

The gliding angle is 11 to 1, which enables the pilot to soar for long distances with the motor shut off. Stalling speed is 30 miles an hour.

Each part of the Aeronca has been given special consideration to make its design successful. A number of ribs and tail surfaces were built and tested for strength and economy of construction. The different fuselage constructions were compared and flight tested. The shape of the airfoil was given special study, and changes were made to improve the stalling characteristics of the plane. The lateral and directional stability were studied prior to construction through tests of models in free flight in gusty air until the lateral and directional controls were determined in the proper relation to each other. It has been demonstrated in taxiing tests that the Aeronca C-2 can turn within its own length.

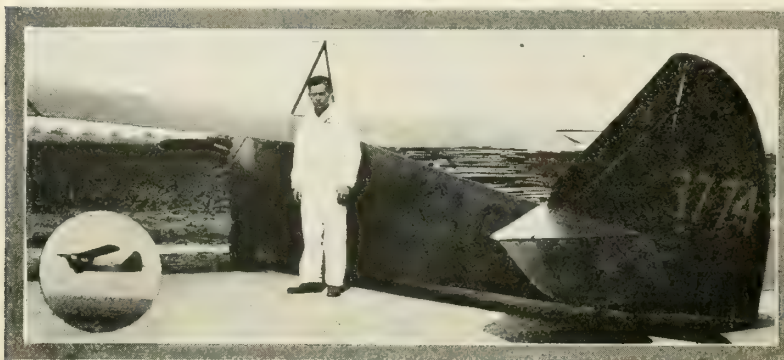
## THE FAIRCHILD STREAMLINED LANDING LIGHT

**T**HE Fairchild Airplane Manufacturing Company of Farmingdale, L. I., is now in production on a new streamlined built-in-the-wing landing light for airplanes. It offers no additional resistance, its weight is less than the weight of the old type of lamp, and it gives illumination ahead, in the air and on the ground.

In recent tests, from an altitude of 750 feet on a hazy night, the lamp showed objects on the ground. At 1,500 feet it picked out objects readily on a clear night. Adjustment over a wide range made on the ground is simple and positive. Each light is designed to cover a field 150 feet wide at 500 feet in front of the plane. At that distance the illumination beams of a pair of lights are almost completely merged. The focus is such, also, that in a vertical plane the ground is fully illuminated when the tail of the airplane is down and trees and other reasonably high objects are illuminated when the tail is up.

The light is not intended as a searchlight; its purpose is to light up horizontal and vertical fields adequately for safe landings and take-offs. It does this at distances of 500 to 800 feet. Adjustment of the light is provided by three different movements; i.e., moving the bulb and socket in a direction parallel to the leading edge of the wing; moving the bulb and socket in a direction parallel to the fuselage; and an up-and-down movement whereby the entire reflector can be adjusted to any desired angle. These adjustments are simple, and when once set they remain fixed.

Fairchild is now manufacturing the built-in-the-wing landing light for equipment on Fairchild planes where they are specified; additional units are being manufactured for sale to other manufacturers and operators of aircraft.



The 35-horsepower Aeronca monoplane, designed by Jean A. Roche

A - COMPLETE - LINE - OF - AIRCRAFT - FOR - LAND - AND - SEA



For the  
school or for  
the sportsman--there is nothing to compare with the  
**EMSCO mid-wing CIRRUS**

## Specifications

Span	35 ft.
Chord	6 ft.
Length	22 ft.
Height	7 ft.
Weight empty	1,090 lbs.
Useful load	550 lbs.
Gross weight	1,640 lbs.
Motor (American Cirrus)	95 h. p.
Gasoline capacity	30 gals.
Oil	3½ gals.

## Performance

High Speed	135 m. p. h.
Cruising Speed	100 m. p. h.
Landing Speed	38 m. p. h.

## Equipment

Bendix brakes, Aerol shock-absorbing struts, navigation lights, and streamlined wheels, tachometer, altimeter, air-speed indicator, oil pressure and temperature gauges.

IT'S a full fledged trainer...yet a thoroughbred sport ship--the first time in aviation history that these two widely different features have been successfully combined in one ship.

Just compare it with any other...thrill with the joy of a spirited take-off...with the incredible climbing speed...cruise at a hundred miles per hour...experience the remarkable ease of handling...land like a feather...then you'll know why we say that there's nothing in the world to compare with it!

Powered with the world famous Cirrus motor and built in one of the finest and best equipped factories in the industry, by a group of master craftsmen who are familiar with every phase of aeronautics, this sturdy little ship is destined to become one of the most popular of the two place sport training models.

There is some desirable territory open to reliable dealers. Complete information upon request.

**EMSCO**

EMSCO AIRCRAFT CORPORATION - DOWNEY [Los Angeles County] CALIFORNIA



# THE STORY OF FRIEZ INSTRUMENTS

**A**MONG the three subsidiary companies of the Consolidated Instrument Company of America, is Julien P. Friez & Sons., of Baltimore, whose history dates back to the year 1876, for over 53 years manufacturer of precision instruments of many and varied kinds. The company has concentrated principally on meteorological instruments, which, up to the present time, have been standard equipment with the United States Weather Bureau. With the advent of air mail and transcontinental air passenger service in the United States, the company began the manufacture of flight and other aircraft instruments. Toward the close of 1928, the firm merged with the Consolidated Instrument Company.

Friez instruments are manufactured in Baltimore in one of the oldest and best-known buildings in the city. The place is called "Belfort Observatory"—Belfort, from the well-chronicled city on the eastern border of France, the native home-place of the founder, the late Julien P. Friez. The first linotype machine was built by the elder Friez in collaboration with the inventor,

Ottmar Mergenthaler; The disc phonograph that superseded the old cylinder type, was first produced by Mr. Friez, as was the Rowland Multiplex machine for dividing the inch into very fine dimensions. Today the institution of Friez continues the manufacture and distribution of scientific and precision instruments under Lucien L. Friez.

Friez weather instruments are used by the United States Weather Bureau in all its numerous large and smaller stations from one coast to the other. These instruments record the number of hours each day that the sun is shining, the depth and duration of rainfall, the direction and speed of the wind, the range of temperature, the drift and history of barometric pressure each hour, the moisture and humidity of the air.

In the agricultural experiment stations supported by the various states, Friez instruments are employed for accurate investigations and research. Friez instruments recording altitude, temperature, barometric pressure and humidity were taken by Commander Byrd on his Antarctic expedition.

A few of the more interesting Friez in-

struments used in aircraft or in gathering meteorological data are described below.

## Hygro-Thermograph

As its name indicates, the Hydro-Thermograph combines upon a single chart the data received from two independent mechanisms, one recording temperature and the other humidity, two air conditions essentially related.

The *thermostatic element*, a Bourdon tube, is situated outside the instrument case at the right and operates a pen-arm, which makes a graph of the temperature variations throughout a range from 5 to 100 degrees Fahrenheit.

The *humidity registering element* consists of fifty strands of human hair mounted at the left and outside the instrument case upon suitable brackets and supports. The variations in humidity are given in percentage readings from 5 per cent to 100 per cent, representing practically complete dryness and complete saturation. The readings are taken directly from the chart; no recourse to tables of humidity is required as is necessary in all forms of wet and dry bulb psychrometers.

The cylinder is set in the center of the instrument and is operated by an eight-day full jeweled anchor escapement clock-movement requiring winding but once a week in either the daily or the weekly recorder.

The charts are so ruled that the horizontal lines are the degree lines for the temperature and at the same time the percentage lines for humidity. The two hours on the weekly recorder are marked both at the upper and lower edges of the chart, the upper time readings being used for the temperature arcs and the lower ones for the humidity arcs.

The base of the instrument is one-piece cast aluminum, to which is hinged the single glass-panel metal case, with a handle above for carrying purposes.

## Combination Recorder

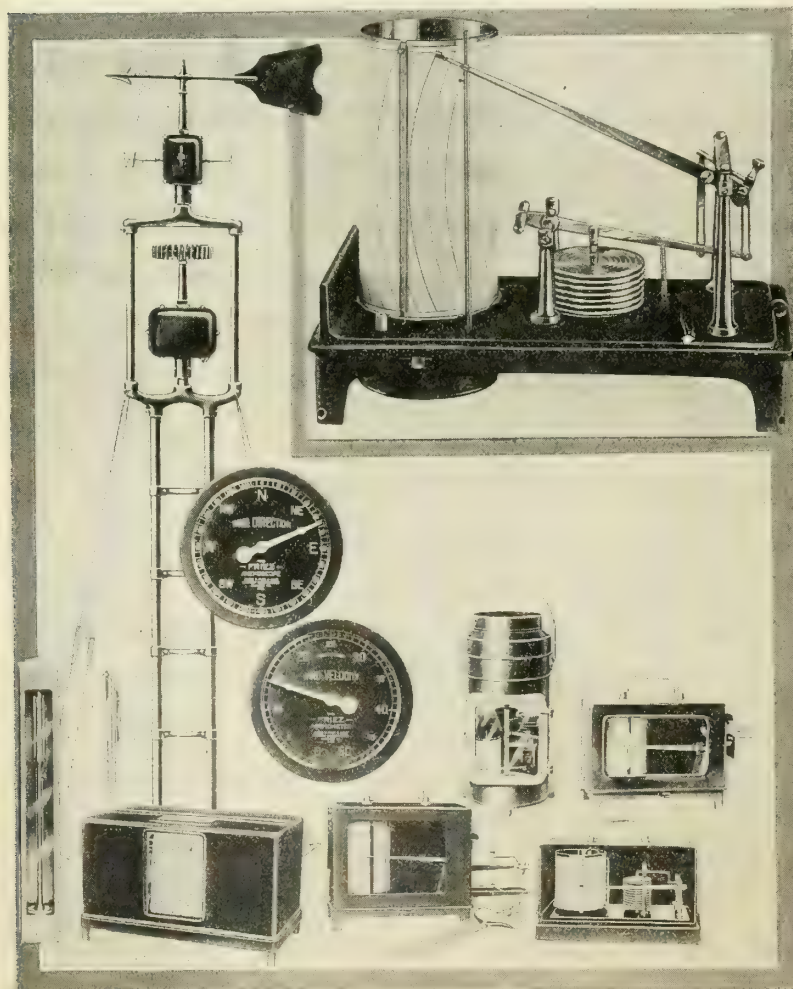
The combination recorder, shown in the illustration, is adapted for combined records of various conditions; for sunshine and rainfall; for wind velocity and rainfall; for sunshine and wind velocity, and also for three combined records of rainfall and sunshine and wind velocity.

Moreover, in addition to its service for meteorological purposes, this two-magnet recorder may be used for the charting of various electrical impulses caused by any operation, provided only that the interval of time between each pulse exceeds five seconds.

By the introduction of the two magnets placed on opposite sides of the record cylinder the combined records may be traced simultaneously upon the same single chart.

## Aero-Meteorograph

The development of instruments for upper air investigations naturally followed



Weather instruments for airports. Above—A high altitude barograph

# Water in Gasoline!!

*Water and Gasoline do not mix — Gasoline floats on water—positive separation... Water settles to bottom of EVERY Gasoline Storage Tank*

## Why You Get Water in Your Ship

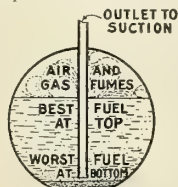
When gasoline is pumped from an ordinary storage tank where suction is from the bottom of the tank your ship is fueled with the worst gasoline in storage.

Water accumulating from condensation or other sources will be pumped out when it reaches suction stub.

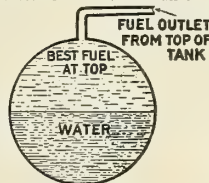
Pump systems should be provided with water separators.

But a water separator in the delivery line collects water and must be cleaned out periodically.

Failure to clean out water separator (and the human equation is far from infallible) results in water getting in delivery line—this water is delivered to airplane tanks.



Let an Aqua Representative explain the entire operation—ask for demonstration—you will understand why an AQUA SYSTEM does not depend on the human equation to prevent delivery of water to an airplane tank.



## No WATER in Your Ship from an AQUA (Fuel) SYSTEM

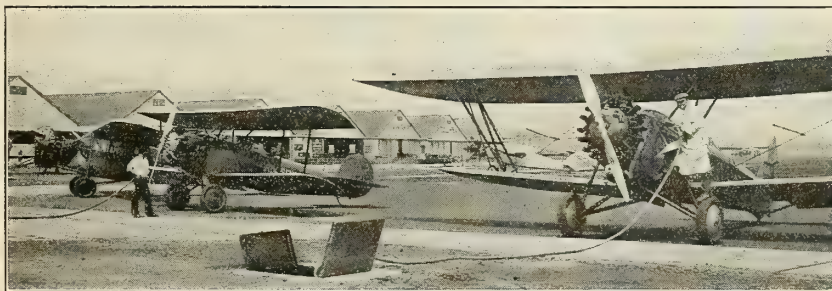
Good, clean, highly volatile and *bone dry* gasoline is always at top of the fuel in every storage tank.

The Aqua System is the hydraulic floatation system. It delivers gasoline from the *top* of the storage—*best* fuel in storage is always delivered to your ship.

The Storage tank itself is a water separator.

The Aqua System is simple and unique in principle.

There is *no dependence* on the human equation. Design of System automatically eliminates any possibility of water ever entering a gasoline line.



Roosevelt Field—Aqua System—7 Fueling Pits are fed from one large underground storage tank through 3,000 feet of underground pipe.

Aqua System has been selected by:—U. S. Army Air Corps; Royal Canadian Air Force; Wright Aeronautical Corp.; Curtiss Aeroplane & Motor Co.; Roosevelt Field; N. Y. Air Terminals, Inc.; Schlee-Brock Aircraft Corp. (Detroit Municipal Airport); Pratt and Whitney Aircraft Corp.; Continental Motors Corp.; American Aero Corp.; Air Associates, Cicero Field, Chicago; etc.

Dehydrated (Bone-Dry) Gasoline — Millions of Dry Gallons—No Forced Landing

## AQUA SYSTEMS, INC.

CHICAGO  
DETROIT

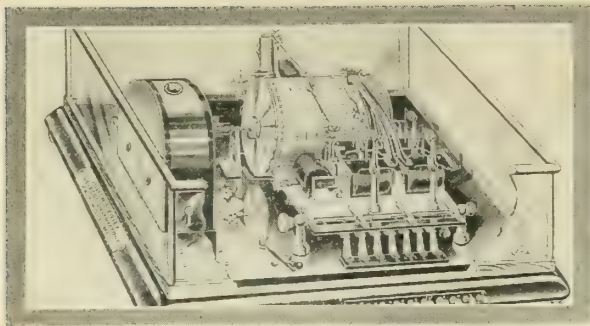
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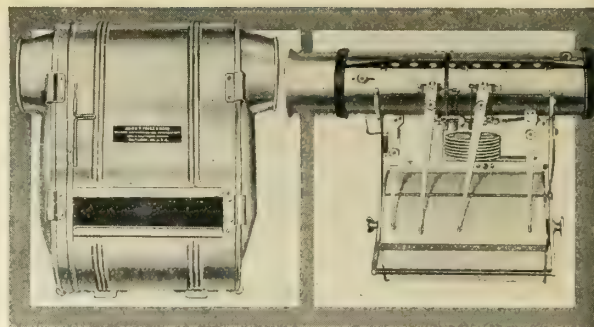
New York, N. Y.

LOS ANGELES  
1008 Washington Bldg.





Recorder for four weather conditions on one chart



Marvin Meteorograph for recording upper air conditions

(Continued from preceding page)

the manufacture of weather instruments for ground observation. The Navy dirigible *Shenandoah* carried a Friez Aero-Meteorograph. The Aero-Meteorograph, which was designed by Mr. William G. Boettinger of the Friez Laboratories for the U. S. Air Service, records simultaneously three atmospheric phenomena: pressure, moisture and temperature. It is adapted especially for use on airplanes and dirigibles. The base, nine and one-half inches long and four inches wide, is made of formed sheet brass and is constructed for greatest rigidity. To the under side of the base a clock is fastened, which controls the time-movement of the upright chart cylinder to which it is directly geared. This cylinder revolves about a tapered shaft of phosphor bronze, securely clamped to the base. A chart engraved for a six-hour triple record is attached to the surface of the cylinder and is held in place by a metallic clip. The three pens which trace the three meteorograms are accurately controlled in their true meteorological movement, since the axes of the pen-arms are each supported on a tapering upright channelled column of sheet brass, precluding distortion or displacement.

**The barometric element.** The actuating element is a single piece corrugated vacuum chamber such as is used in all Friez barographs and is attached to the base of the instrument. Tests made by the U. S. Bureau of Standards show that this sensitive barometric element is accurately sensitive to all changes of altitude whether made rapidly or slowly. Its movement in this instrument is transmitted directly to the axis of the pen-arm, and records changes of pressure between 775 and 450 millimeters of mercury, corresponding to an altitude of about 4,200 meters. A thumb nut conveniently located on the pen-arm controls the setting of the pen to agree with the pressure indication of a mercurial standard.

**The hygrometric element.** The actuating element is a multiple strand of human hairs, specially treated, whose elongations and contractions are directly transmitted to the pen-arm. A thumb nut on the top surface of the instrument base allows the pen to be set to agree with the interpreted reading of a wet and dry bulb hygrometer. The range of the readings is from 0 to 100 per cent of relative humidity.

**The thermometric element.** The actuating element is a Bourdon tube filled with

alcohol. The folding and unfolding of the Bourdon tube under temperature changes is directly transmitted to the axis of the pen-arm. There is a thumb nut on the pen-arm by which the pen may be set to agree with the reading of a mercurial thermometer. The temperature range is from 30 degrees below zero to 40 degrees above, Centigrade.

The complete mechanism is enclosed in a non-ferrous metal case, hinged to the base and perforated to allow free circulation of air, provision also being made for the suspension of the instrument in the cockpit of the plane by means of elastic cords.

#### Altitude Barograph

Most of the attempts at altitude flying made by the United States aviators, have been recorded by Friez Barographs. The original Friez altitude barograph was designed by Mr. William G. Boettinger, of the Friez Laboratories, for the U. S. Air Service. It has as the sensitive pressure element a single corrugated metallic tube called the sylphon vacuum chamber in place of the older type of a stack of separate cells. Since there are no soldered joints on the elastic expanding and contracting edges of the sylphon, errors resulting from lag or hysteresis are obviated and compensation for change in temperature is completely attained. A single lever and link transmits the motion of the sylphon element directly to the pen-arm, thus reducing loose play and friction to a minimum. This direct action feature, because of the large expanding and contracting movement of the sylphon without distortion, is not found in any other make of barograph. This altitude barograph exhibits no lag or after effect, the pen returning immediately to the true pressure reading of the landing field, even when used over the total pressure range of the chart.

Instruments are equipped with either a one, six or twenty-four-hour cylinder. A three-inch chart, with inches of pressure equally spaced throughout the scale, records changes in pressure from thirty-one inches to eight inches of mercury, barometric pressure.

The clock used has a jeweled anchor escapement and is especially constructed to endure the low temperatures of high altitudes. Enclosed in a dust-proof case, the clock does not revolve with the chart cylinder, but is secured solidly under the base of the instrument itself, thus reserving the full strength of the clock for the movement

of the chart cylinder.

The base of the instrument is of one-piece cast aluminum, in which there can be no bending or distortion. A copper case with glass-panel front and fitted with handle and suspension rings encloses the mechanism. A nonfreezing ink and suitable charts are supplied with each instrument.

#### Marvin Meteorograph

This meteorograph, designed by Prof. Charles F. Marvin, Chief of U. S. Weather Bureau, is a combination of accurate devices used in recording temperature, pressure, relative humidity, and wind velocity of the upper air. A light, rigid, horizontal tube encloses the anemometer, the temperature element and the hygrometer hairs, while the pressure element is mounted on the frame beneath the tube. The recording pen-arms supported from above oscillate through a vertical plane. The instrument is constructed, as far as possible, of aluminum and weighs less than two and one-half pounds, rendering it especially suited for kite observations.

The clock is of special design with full jeweled anchor escapement and rotates the drum once in eight hours. The recording cylinder enclosing the clock is rigidly set within the frame of the instrument, but is easily removed in order to renew the chart by loosening the thumb nuts on each end of the axis, the thumb nut to the left serving also for winding the clock.

**The barometric element** is the same sylphon vacuum chamber as in all Friez barographs. While the recording pen-arm moving through an arc of fifty millimeters gives records of altitude up to five kilometers, a special adjustment allows it to be used also in record flights up to seven kilometers.

**The temperature element** is a curved bi-metallic strip of duplex metal, prepared by permanently welding throughout their entire length two metals having widely different coefficients of expansion. The combination of metals used, Invar steel (an inert metal) and special brass, gives the greatest amount of deflection per degree of temperature change that can be obtained with reliability and sensitivity.

**The humidity element** is made up by sixteen single and separate human hairs, mounted longitudinally within the tube. They transmit their elongations and contractions directly to the pen-arm, while a

(Continued on next page)

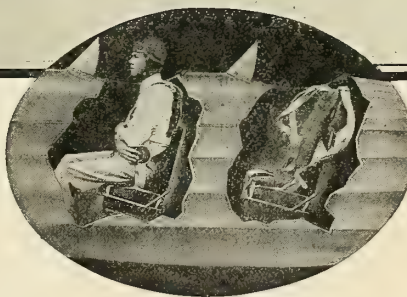
# RUSSELL "Lobe" PARACHUTE



*Now* **EQUIPPED**  
with the new  
**RUSSELL**  
**DETACHABLE BACK-PAD**

*The Russell "Lobe" Parachute fits right into the seat—and this new detachable BACK-PAD holds the harness in position while forming an additional cushion for greater comfort.*

*You fasten and unfasten the parachute harness while you are seated in the cockpit—in the same manner as you snap the safety belt. It's all very simple and practical..... An indication of the many other refinements you will find in the Russell "Lobe" Parachute.*



Famous flyers, air transport companies, training schools, individual flyers and aerial passengers the world over have adopted the Russell "Lobe" Parachute as standard flight equipment.

In an emergency you simply pull the release ring—the Russell "Lobe" Parachute does the rest..... It has a record of 100% efficiency in use!

*Descriptive Folder and Name of Nearest Service Station and Dealer on Request.*

Veteran air men prefer this aerial life-saver because it has no springs, no rubber bands, no pilot chute—nothing to deteriorate, nothing to get out of order.

*Ask about the new Russell "Lobe" Pongee Silk Parachutes, selling at \$275. Other Models, \$250 to \$350.*

**Russell Parachute Company**  
**1202 Kettner Blvd. San Diego, California**

**Eastern Sales Office: 122 E. 42nd St., New York City**



(Continued from preceding page)  
reclaiming spring holds the hairs at a constant tension.

The wind element is a small fan set in the wind-facing end of the tube, which communicates its rotation to a cam moving in turn the pen-arm to record directly and mechanically the wind velocity in miles per hour. The pitch of the fan-blades can be easily changed to give records in kilometers in place of miles.

The record sheet is an engraved paper chart with a separate space for each recording pen. Conveniently located adjustments make the pen-settings easy for the observer.

A light polished aluminum case shelters all parts except the inside of the screening tube and the anemometer head.

### Balloon Meteorograph

Much greater than the altitude record established by man is that which is often reached by a Friez Balloon Meteorograph. It consists of an instrument suspended on two hydrogen balloons, the combined weight of which is 200 grams (7 ounces). This miniature craft is capable of ascending to an altitude of from 18 to 19 miles, approximately 100,000 feet, more than twice the record established in heavier-than-air craft. The balloon meteorograph records humidity, temperature and barometric pressure. This knowledge of atmospheric conditions of the upper air strata gives advance information of the ground level conditions likely to be encountered within the next 24 hours. The Balloon Meteorograph was designed by Mr. S. P. Fergusson of the Weather Bureau.

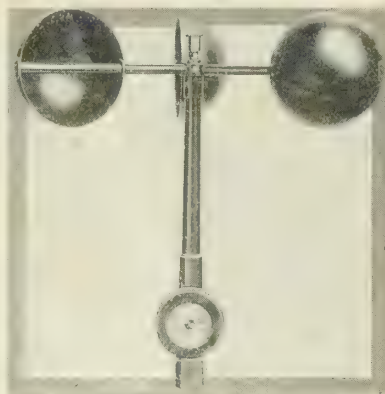
The clock, which rotates the time-cylinder, to which the meteor-chart is attached, is especially constructed to reduce weight and is adapted to limit the revolutions of the cylinder to the time-period of the actual air-flight, thus preventing unnecessary and confusing ground-records after descent.

The barograph element is a vacuum Bourdon tube. A specially contrived link-motion controls the arc of the pen-arm which with its peculiar reversing movement, traces a record double the extent of the meteor-chart, giving for higher altitudes on an open scale easy and accurate readings. The range of the recording style is equivalent to the complete range of a mercurial barometer.

The temperature recording pen is actuated by a three-quarter cylinder of thin thermostatic metal, compact sheets of invar and bronze. It is inclosed in a doubly insulated tube, insuring protection from direct sunshine and from heat radiation. The scale here adopted is one millimeter of chart space to each two degrees Centigrade.

The humidity element, consisting of ten separate strands of human hair with a reclaiming spring to maintain constant tension, is mounted and insulated in the same tube with the temperature element. The range through fifteen millimeters is from zero to one hundred per cent of relative humidity. The record on a compact scale shows the direction rather than the amount of the humidity registration.

Those who are familiar with aerological research will understand that the chart used in this meteorograph is not an engraved paper one, but is a smoked aluminum sheet, the observed tracings on which will be afterwards graduated by comparative tests in the laboratory. The chart cylinder itself is three inches in height and the axes of the three recording styles are so located at the same height above the base that the styles

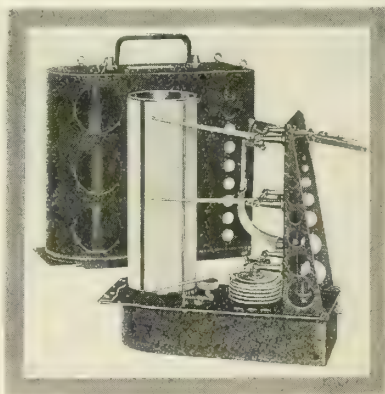


Anemometer with 3-cup rotor

have the same time-arc on the rotating cylinder which makes one complete revolution in one hour.

### Miscellaneous

Besides weather instruments on the ground or in the upper air, Friez instruments are used for water records. Friez water stage recorders were used in Panama to show the drainage of water into the projected Gatun Lake; and today, in all the large water-power projects of the country,



Meteorograph used on dirigibles

these instruments make a record of the rise and fall of the water's surface, in normal times as well as in flood uprisings.

The Friez Company developed a new method and system of indicating and recording wind velocity and wind direction, for special installation on the Navy's two airplane carriers, U. S. S. *Saratoga* and U. S. S. *Lexington*. The Friez wind apparatus shows, on seven dials located at various points on shipboard, the speed of the wind

and its direction across the ship. For landing, even on terra firma, it is important for the pilot to know the speed and direction of the wind but, for landing on the very restricted area of a floating airplane carrier, this knowledge is even more important. The company was allowed a tolerance of plus or minus two knots of wind velocity. In tests conducted by the Bureau of Standards, the instruments checked to an average of less than one knot for all indications.

Another intricate device incorporated in the wind apparatus for moving ships is the wind corrector. By a series of motors and racks and gears, all working smoothly and in unison, this corrector apparatus takes account of the speed of the moving vessel and the direction of its travel, and computes the actual and true wind and its direction, independent of the vessel's direction or speed of travel. Connected with this same system is a wind-direction and wind-velocity recorder, giving an inked record of all the variations of wind intensity and direction.

The Friez Company has also recently placed on the market a long-distance indicating gauge for all kinds of liquid levels, as those of gasoline, crude oil, alcohol, water in reservoirs, etc. The gauges show accurately such levels to the thirty-second part of an inch, and will operate without any care for many years.

Likewise the company has, among its recent developments, perfected a Bacteria Colony Counter, which is used in many Health Department laboratories, and in the testing rooms of dairies, filtration plants, canned goods establishments, and wherever colonies of bacteria in food and water are counted and catalogued.

Since becoming a manufacturing and research division of the Consolidated Instrument Company, Friez has developed and made improvements in many aircraft instruments, a large portion of the parent company's products being manufactured at the Baltimore factory. There one may see employees who worked with the elder Friez on precision instruments thirty and even forty years ago, now putting that experience, supplemented by the knowledge of more recent developments, into the present products of the consolidated companies.

Very soon demolition of the historic old buildings at Belfort Observatory in Baltimore will take place and a new and up-to-date manufacturing plant will be erected on the site, which will add considerably to the facilities.

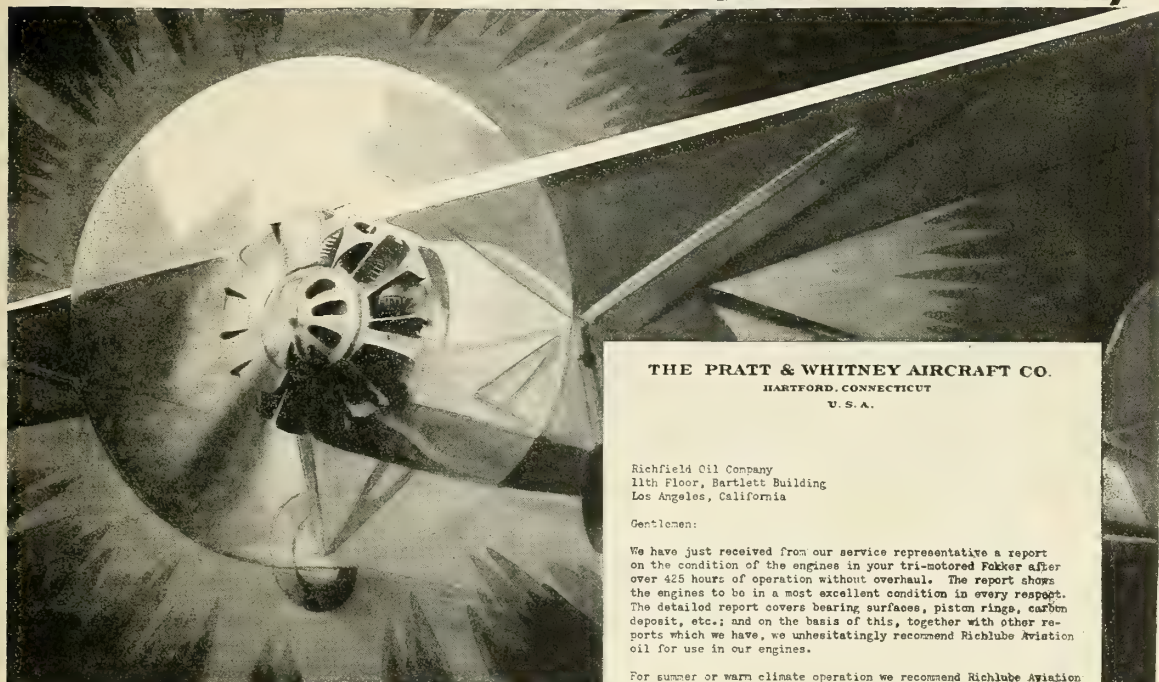
## WIND-OPERATED LIGHT

TESTS of a new type wind generator expected to lower costs for operating and maintaining beacon lights in isolated sections along national airways are in progress in Alexandria, Va., according to a report made public recently by the Airways Section, Department of Commerce.

The new equipment will require change of lamps only once in six months, and distilled water for storage batteries only once a year.

# "WE UNHESITATINGLY RECOMMEND THEM"

— Pratt and Whitney



THE PRATT & WHITNEY AIRCRAFT CO.  
HARTFORD, CONNECTICUT  
U. S. A.

Richfield Oil Company  
11th Floor, Bartlett Building  
Los Angeles, California

Gentlemen:

We have just received from our service representative a report on the condition of the engines in your tri-motored Fokker after over 425 hours of operation without overhaul. The report shows the engines to be in a most excellent condition in every respect. The detailed report covers bearing surfaces, piston rings, carbon deposit, etc.; and on the basis of this, together with other reports which we have, we unhesitatingly recommend Richlube Aviation oil for use in our engines.

For summer or warm climate operation we recommend Richlube Aviation No. 4; and for winter or cold climate operation, Richlube Aviation No. 2.

These oils are, of course, now on our approved list and will be included in the next revision of this list sent to owners and operators.

As you are probably aware, we consistently advocate the use of California base gasolines in all of our engines. The excellent condition of your engines amply justifies our recommendations and indicates that your California base Aviation gasoline is satisfactory in all respects.

Yours very truly,

*L. S. Hobbs*

L. S. Hobbs  
Manager, Engineering Service

MANUFACTURERS of the world-famous "Wasp" and "Hornet" motors, Pratt and Whitney are among the leaders in the field of aviation engine design. After rigid tests conducted by their own service department, they have given their unqualified approval to Richlube Aviation Oils, recommending them for both summer and winter use in their motors. Richfield Aviation Gasoline, too, receives the stamp of approval from this famous aviation concern. Pratt and Whitney, in endorsing Richfield, join a distinguished list of aircraft concerns who use and recommend Richfield products—including Fokker, Lockheed, Western Air Express, Maddux Air Lines, Stand-

ard Air Lines, Union Air Lines, Mid-Continent Air Lines and T. A. T. (Western Division). Richfield products and service are available throughout the West and at many points in the East. Use Richfield and Richlube in your own plane for maximum performance.

# RICHFIELD



# and RICHLUBE



# BUHL AIRSEDAN CONTROL FEATURES

**T**HE arrangements of control fittings and the painstaking care employed in their installation and inspection constitute outstanding features of the new model Buhl Airsedan, six-place externally-braced biplane manufactured by the Buhl Aircraft Corporation, Marysville, Michigan. In the present system, all riveting has been eliminated. Round welds on steel tubing, which forms the major part of the control assembly, have been superseded by the newer "fish-tail" or oval weld, which has been shown by actual test to retain the original strength of the tubing considerably past the juncture of the two sections, not more than five per cent of the tube's original strength being sacrificed by the weld. Thus the injurious effects of constant motor vibration and unexpected landing shocks have been minimized, and the operation of the control system as a whole, considerably benefited.

Full dual control is provided. Two control columns, side by side, are placed conveniently accessible to the two front seats, and rudder pedals and brake connections occupy conventional locations on the floor. Between the two seats of the controls is a lever, made of steel tubing, which projects upward at an angle from the floor, and which replaces the conventional wheel as the stabilizer control.

One of the most interesting features of the new system is the split-type bearing box which supports each column on a section of tubing running transversely across the cabin under the floor. About one-third of the distance from its lower end, the control column is hinged to an angle brace, which inclines at 45 degrees toward the center and which terminates in the split bearing box. Through this box pass the aileron control links joining the two columns and the section of tubing supporting the whole assembly and providing for free movement of the column in a fore-and-aft direction. The two boxes are joined together by a short section of larger tubing with bolted flanges. The flanged ends are provided with extensions to which the elevator control cables are fastened. The structural member under the floor which carries the weight is braced with smaller sections of tubing to the main structural assembly of the fuselage. The result of the new design is greater structural strength in the mounting of the control columns, as well as a simplified relation of the transverse movement of the aileron controls to the fore-and-aft movement of the elevator controls.

The elevator cables are attached to the control fitting by means of an eye-splice in the forward end, through which a clevis is passed and bolted to the fitting. The two cables then lead directly aft under the floor to the tail group, where they pass around pulleys to the upper and lower arms of the elevators. The same eye-splice and clevis system is employed to join the cables to the elevator arms.

By B. F. LAKE

A novel method of aileron control is obtained through the use of a long section of cadmium-plated steel tubing, which is provided with special welded fittings at each end, terminating in pivoted connections. The aileron control links seen in the stick assembly are connected to the pivot, and thus the sidewise movement of the control stick travels to this point, from whence the tube conveys its backward to the front edge of the cabin door. Here the other end fitting is likewise connected with a pivot joint to a vertical section of tubing, which conveys the movement upward to a point in line with the center of the wings. At the upper end, a bell-crank translates the motion from vertical to horizontal, and it proceeds in

tests is amply demonstrated by the total lack of accidents resulting from failure of any part of the control system.

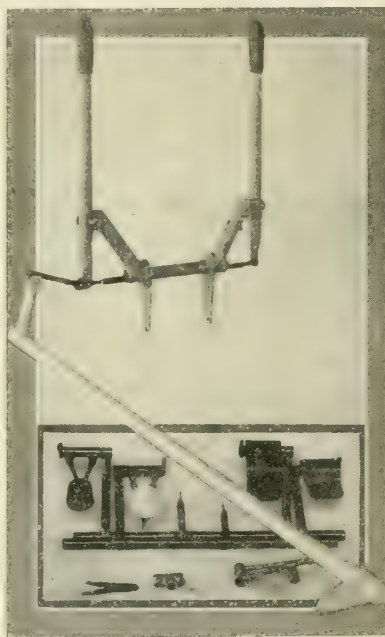
Two steel tubes pass along the floor in front of both pilots, each carrying one rudder pedal for each set of controls. T-shaped fittings slip into position over the main rudder tubing, and are welded with the previously-described oval weld method. The foot pedals with their supporting members, are, in turn, welded to this T-shaped fitting, so that both sides of the dual-control system operate simultaneously. Projecting central arms welded to the main tubing terminate in eye-holes to which the rudder cables are fastened with the same eye-splice and clevis-pin system.

Brakes being optional equipment in the Buhl Airsedan, a slightly different fitting is used when they are to be installed and connected to the foot pedals. In place of the single support for the rudder pedals, a double support is employed, and a swivel fitting is connected so that a slight oscillating movement of the foot pedal operates each wheel brake independently in any position of the foot pedal.

Installation of the control system is done by highly-skilled workmen, and a most rigid system of inspection prevails throughout installation and final assembly. Expert pilots, when faced with failure of a main structural member of the plane in flight, have sometimes been known to bring the plane to a satisfactory landing without loss of life or serious injury. But in the event of failure of the control system in the air, no amount of skill can prevent the inevitable crash. For this reason only the highest skill may be safely employed in the installation and inspection of this most vital part of the airplane's structure. One explanation of this policy is found in a list of the number of parts which make up the control apparatus.

In the control column assembly, there are 26 separate pieces to be inspected during installation. The split bearing boxes, with their bolts and nuts, add 16 more. The elevator control assembly presents a total of 19 items, including bolts, nuts, pulleys and housings. Therefore, in the elevator and aileron controls alone, there are 61 separate pieces to be inspected both during and after installation in the new airplane.

In the method of installing the controls, expansion and contraction from extremes of temperature have been guarded against, and the tendency of connections to loosen from engine vibration has been overcome. The absence of rivets removes a large part of the trouble caused by both of these conditions, and the close inspection given the final assembly reduces operating risk to a minimum. Combined with inherent strength of the chrome-molybdenum steel tubing and the improved oval weld, the control of the new Buhl Airsedan presents an increase in operating efficiency, and an assurance of successful and safe operation under flight conditions.



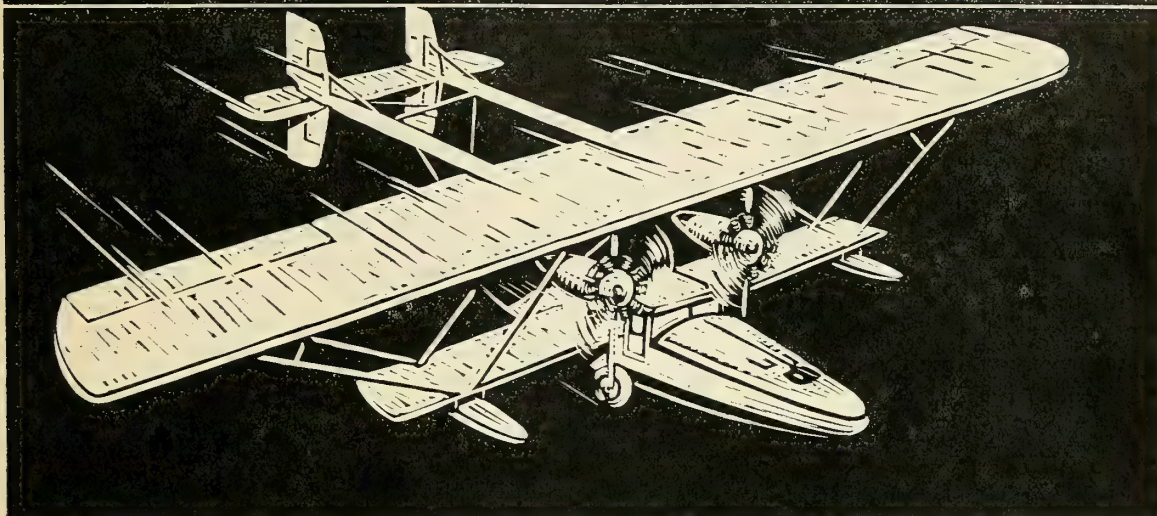
Buhl stick and foot pedal assemblies

both directions through additional sections of tubing to the point of connection with the aileron extensions. In this manner the movement of the control column is transmitted to the ailerons through chrome-molybdenum steel tubing and positive-acting pivot joints, eliminating cables, pulleys and hidden sources of trouble.

The sub-assembly of foot pedals for rudder and brake control is made from 1- $\frac{1}{8}$  inch, 1 inch and  $\frac{3}{4}$  inch chrome-molybdenum steel tubing, with the foot plates formed from rigid steel plate. The complete rudder control assembly weighs only 11 $\frac{1}{2}$  pounds, and tests show that it will withstand seven and a half times as much strain as would normally be placed upon it. Similar strength tests are given the control column assembly, and the value of the



# OVER LAND AND SEA



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ability. Your ability will depend upon your training.

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Every branch of Aeronautics is taught thoroughly. If your desire is to become a pilot, mechanic, airplane salesman, transport company or Aviation school executive you will receive the right training here. Don't waste time. Investigate today.



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TULSA is in the heart of the oil country. It is the Oil capital of the World. People here are air-minded. The opportunities for trained men right here are unlimited. One transport company alone here operates 14 Wasp Tri-motored Fords and 9 Lockheeds. Oil companies need and use airplanes daily. You'll make no mistake in coming here where you can fly the year round.

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Philtower Building.  
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GENTLEMEN:

I am interested in learning more about your school of Aeronautics. I am planning on starting training on or about \_\_\_\_\_ 19\_\_\_\_. I understand this request for information will in no way obligate me.

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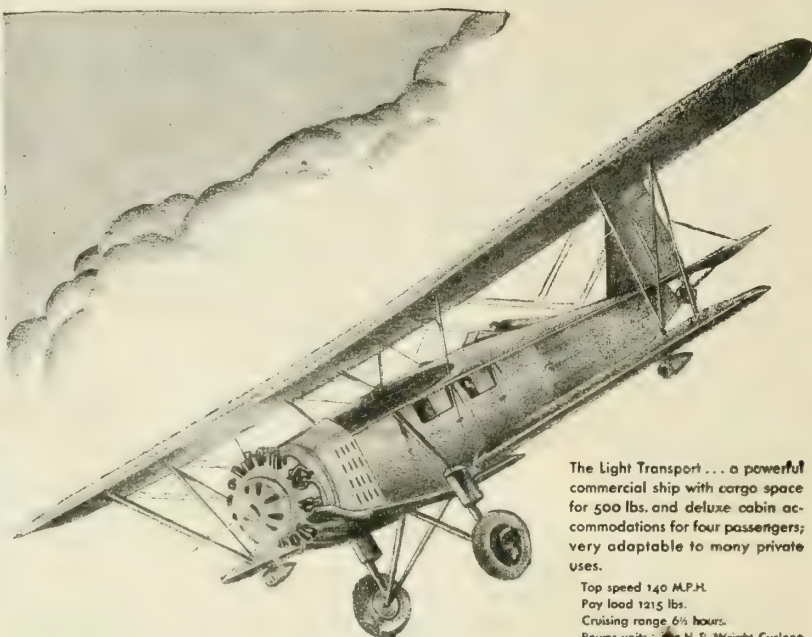
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City \_\_\_\_\_ State \_\_\_\_\_



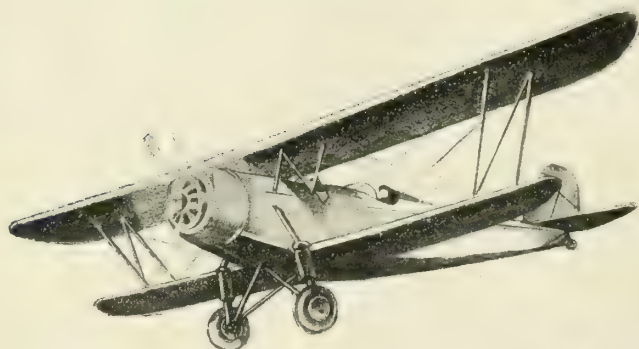
**T**HE design workmanship and inbuilt safety that have been characteristic of Stearman in the past are even more pronounced and outstanding in these 4 new models. However exacting your demands for transportation may be, you will find a Stearman to meet them safely, comfortably and economically.

THE STEARMAN AIRCRAFT COMPANY  
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The Light Transport... a powerful commercial ship with cargo space for 500 lbs. and deluxe cabin accommodations for four passengers; very adaptable to many private uses.

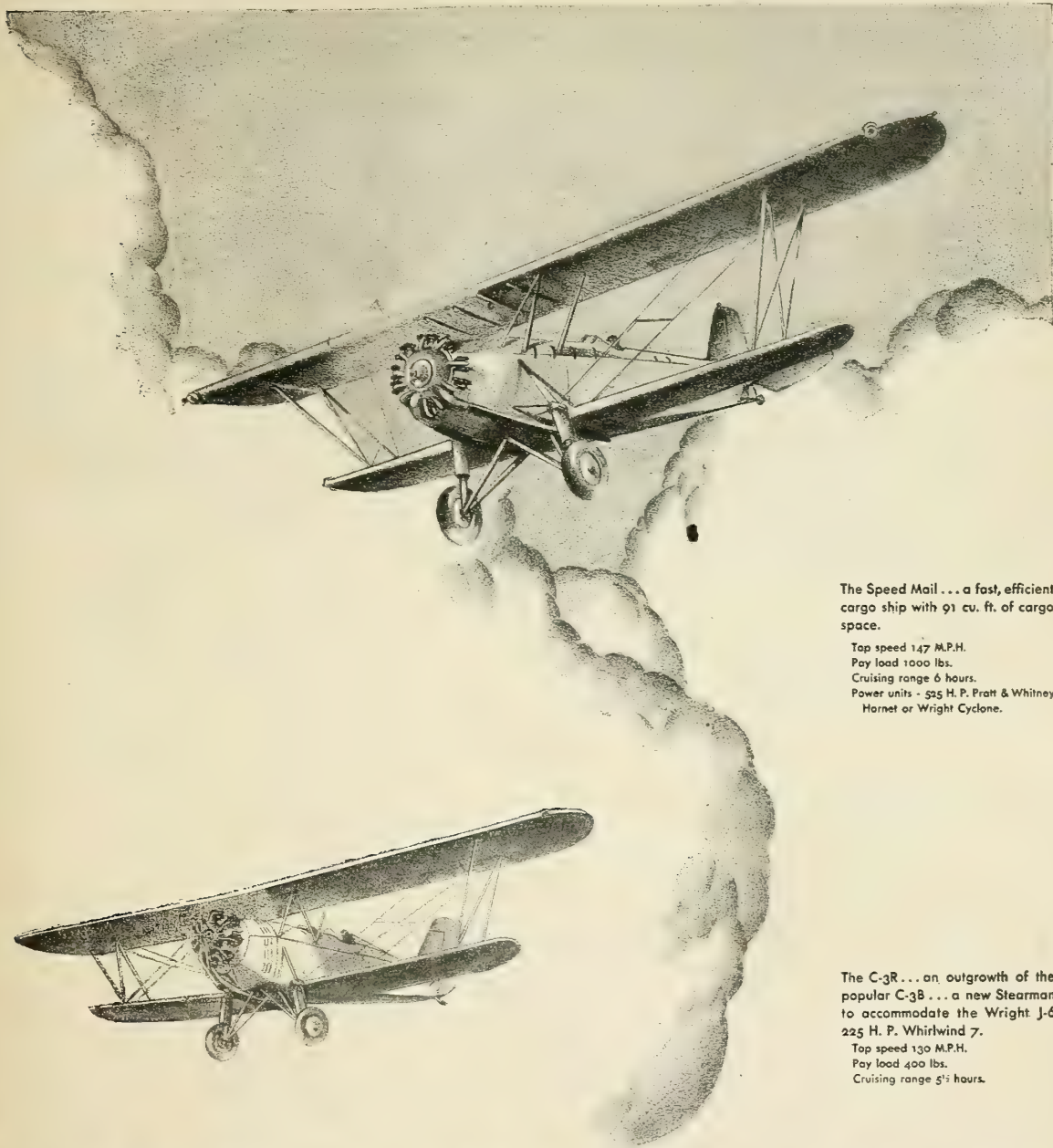
Top speed 140 M.P.H.  
Pay load 1215 lbs.  
Cruising range 6½ hours.  
Power units: 1 H. P. Wright Cyclone or Pratt & Whitney Hornet.



The C-4A... a high speed sport plane adaptable to various commercial uses.

Top speed 153 M.P.H.  
Pay load 600 lbs.  
Cruising range 5½ hours.  
Powered with Wright J-6 300 H. P. Whirlwind or Pratt & Whitney Wasp on special order.

# 4 NEW APPEAR OVER



The Speed Mail... a fast, efficient cargo ship with 91 cu. ft. of cargo space.

Top speed 147 M.P.H.  
Pay load 1000 lbs.  
Cruising range 6 hours.  
Power units - 525 H. P. Pratt & Whitney  
Hornet or Wright Cyclone.

The C-3R... an outgrowth of the popular C-3B... a new Stearman to accommodate the Wright J-6 225 H. P. Whirlwind 7.  
Top speed 130 M.P.H.  
Pay load 400 lbs.  
Cruising range 5½ hours.

# STEARMAN'S THE HORIZON





# WESTERN NEWS

## WESTERN AIR EXPRESS INCOME REPORT

WESTERN AIR EXPRESS recently reported net income for the first half of 1929 of \$536,490 as compared to \$720,778 net income for the whole of 1928, and \$661,608 for the period of 1929 to August 1. Revenue for the first half of the year was listed as follows: mail, \$1,043,157; express, \$2,874; passenger service, \$127,035; special service, \$39,426; airplane rental, \$5,941; total revenue, \$1,218,518. Total expenses were \$669,052. The balance sheet as of July 31, showed total current assets of \$2,194,629; other assets, stocks and bonds, \$148,697; total fixed assets, less reserve for depreciation, \$1,745,318; prepaid and deferred items, \$47,439; total assets, \$4,136,982.

During the first six months of this year the company carried 13,102,715 pieces of mail and 7,880 passengers. Western Air Express operates 12-passenger Fokker monoplanes over its lines, chief of which is its Los Angeles-Kansas City service; and it recently inaugurated transcontinental air-rail service in connection with the New York Central, Santa Fe and Chicago and Alton railroads.

## WESTERN AIRCRAFT SHOW AT LOS ANGELES

CLIFFORD W. HENDERSON, managing director of the National Air Races and Aeronautical Exposition, left Cleveland immediately upon the close of the National Air Race events to manage the Western Aircraft Show to be held at Los Angeles November 9 to 16. The Western Aircraft Show will have more than 100,000 square feet of display space, and is approved by the Aeronautical Chamber of Commerce of America through its show committee. The Western Aircraft Show has the endorsement of the Los Angeles Chamber of Commerce, National Aeronautic Association (Southern California Chapter) and Professional Pilots' Association.

A NEW course in Physics of the Atmosphere is to be given this fall at the University of Southern California, according to announcement of Professor Arthur Nye, head of the Department of Physics at the university. Atmospheric circulation, storms, atmospheric electricity, hygrometry, atmospheric optics and acoustics, and the laws of climatic control are to be studied, as well as problems of gathering and interpreting meteorological data, temperature and pressure relations in the atmosphere, and atmospheric composition.

The new course is arranged for fliers and as a background for those who may be

considering connection with the United States Weather Bureau.

## Seven Months' Report of Aero Corporation of California

THE Aero Corporation of California recently released a consolidated earnings report covering the first seven months of this year which showed a net deficit after all charges including depreciation and reserve for contingencies of \$25,203 with a net income for the period of \$153,067. Net profits for July totaled \$7,753 and operating income was \$37,152.

Gross revenue totaled \$285,371.26 as compared with \$157,550 for the similar period of 1928. Exclusive of the revenues of the Standard Airlines the gross revenue of the Aero Corporation was \$247,898.26 as against \$133,550 in the 1928 period.

The rapid expansion of the corporation is revealed in the growth of total assets which were listed at about \$69,000 on July 13, 1928, as compared with \$982,823.47 on July 31, last. Current assets on the latter date were \$367,352.97 against current liabilities of \$56,928.23.

## CONTACTS

[By F. E. SAMUELS]

THROUGH the courtesy of the Standard Airlines I had an opportunity to travel along with the flyers of the Woman's Air Derby, from the start of the race at Santa Monica, Calif., to El Paso, Texas, making the control stops with them and witnessing the landings and take-off of the contestants at the different towns enroute. I believe that the manufacturers of the different planes, entered in this event, have learned that it will be to their advantage, in case of another such race, to have a service plane with a competent mechanic accompany the plane produced by them. For almost a score of women to start racing across country, most of them without any previous cross-country flying experience, and very few of them with any mechanical knowledge, does not seem like a real sporting

proposition to me. Taking off as they did in the early morning, not knowing whether their motor was in condition to fly or not, is almost too much to ask an aviatrix to do.

The above applies to the manufacturers of the different motors used in an event of this kind. They did not receive the benefit from the event that they might have had, if their motors had had proper servicing along the route. A few of the entrants were looked after by the representatives of the planes or motors which they flew, and each of the fliers so aided were in at the finish of the race at Cleveland. Amelia Earhart had a Lockheed service plane as far as El Paso; Jim Granger, Swallow distributor from Clover Field accompanied Ruth Elder in his service plane over the entire route. Thea Rasche had a D.H. Moth service plane. Doug Kelly, chief pilot of the Airtech School of Aviation, San Diego, looked after Phoebe Omlie's plane, and Gladys O'Donnell had Mr. O'Donnell, from Long Beach along in a service ship to look after her plane. The Kinmer Motor Company had a service ship, to look after Kinmer Motor flown planes. I may have missed some service ship—but unintentionally.

The flyers, manufacturers, and everyone connected with an event of this kind in the future, will be benefited with the experience gained from the first Woman's Air Derby, and no doubt the next event of this kind will be even a greater success.

WHILE on the subject of the Woman's Air Derby, I must mention the efficient manner that the committee in charge of the race at the International Airport, Douglas, Arizona, handled the crowd of spectators, and the protection they furnished the flyers' planes over night. A heavy guard of armed troops from Fort Bliss, Douglas, policed the airport, during the arrival of the flyers. One of the colored soldiers sat in the cock-pit of each plane and a detail of them patrolled the field all night. As each aviatrix arrived at the airport, she was met by a Douglas woman, appointed by the committee, and was driven to the city, the Douglas woman being her host during her over-night visit. A banquet in the evening at the Social Club, across the border at Agua Prieta, attended by over 200 was one of the events of the trip, and one that will be remembered by everyone present.

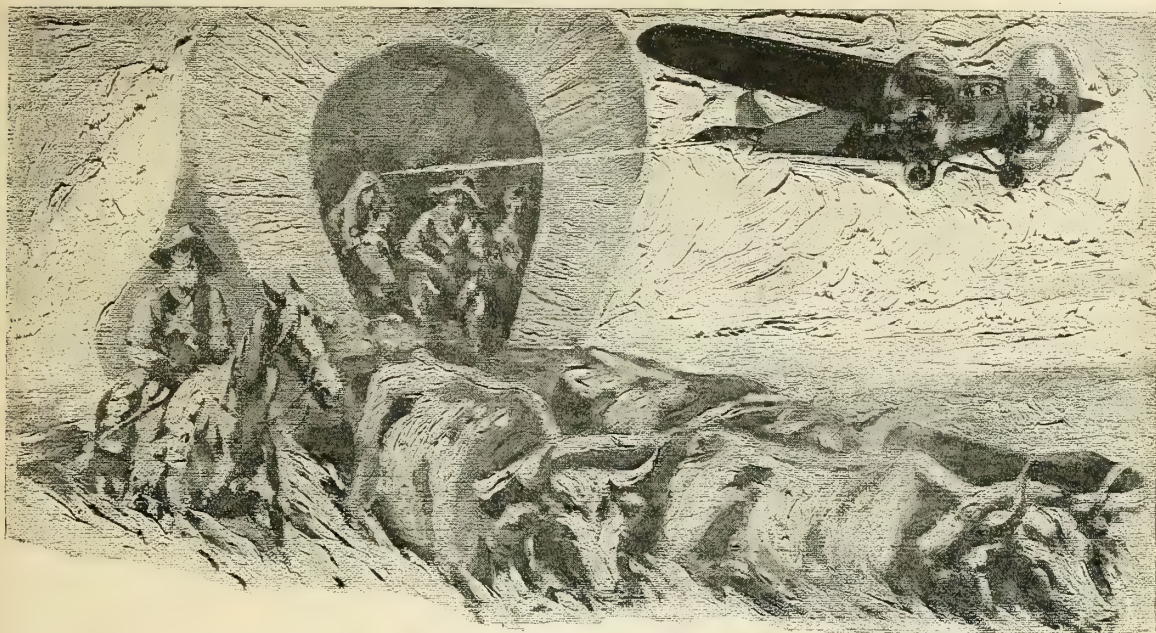
THE officials of the Bach Aircraft are elated over the records that their motorized transports are hanging up and the speed that these Air Yachts are developing. One of their stock planes, flown by Waldo Waterman, manager of the Los Angeles Metropolitan Airport, has made the American payload altitude record, of 20,000 feet, carrying a deadweight load of 2,220 pounds,

(Continued on next page)

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# An even greater reward *awaits* TODAY'S TRAIL BLAZERS !

Industry enjoys many important advantages in Los Angeles County.

- ...Year 'round equable climate.
- ...Largest concentrated market on the Pacific Coast.
- ...High per capita buying power.
- ...Splendid transportation facilities that provide economic access to all Pacific Coast markets and to export markets.
- ... Contented labor.
- ...Attractive living conditions for labor.
- ...Low building costs.
- ...Abundant low-cost power.

The "Covered Wagon" trail-blazer of '49 had no recourse to facts and figures. He came West...on faith. Today's trail-blazer...the air-minded manufacturer... has unlimited facts and figures to guide his decision. He is coming West...to Los Angeles County...not just on faith but because comparative facts and figures at his disposal show that Los Angeles County is more ideally suited for the aircraft industry than any other section of the United States.

...more hours of sunshine...less wind...less rain  
...year 'round equable climate...more licensed pilots...more skilled mechanics...more aviation schools...more students in training...more identified and licensed airplanes in service...more airports...more aviation activity.

These are not just opinions. They are facts proven by statistical reports compiled by responsible and unbiased authorities...and available to you.

*Air-Minded*



# LOS ANGELES COUNTY

Complete detailed surveys and information supplied, upon request, by INDUSTRIAL DEPT., LOS ANGELES CHAMBER OF COMMERCE



*(Contacts continued)*

and two other stock planes took first and second place in the transport race at the Cleveland meet.

With twelve of these 10-place, trimotored transports on the line, under different stages of construction, the September schedule calls for the completion of six planes, which are to be delivered to the Pickwick Airlines and to the Schlee-Brock Aircraft Corporation, at Detroit, Mich. The latter delivery is on the order of thirty-five ships recently placed with the Bach Company.

THE officials of the Pacific Aeromotive Corporation have added so many branches to their fast growing business at different airports, that it has become necessary to keep a service ship in commission at all times to fly parts to the different branches and to service ships wherever they may be in trouble. A new Whirlwind-powered Travel Air has just been purchased by the corporation and it is giving wonderful satisfaction. Tommy Thomas is making all his long distance business trips in the new plane.

WHILE writing this, word comes that Jack Frye and Paul E. Richter, Jr., Standard Air Lines executives, have just come down from an altitude test flight in the *Arizona*, one of the trimotored Fokkers of the Standard Airlines, their altimeter showing a height of 23,200 feet. They carried a sealed barograph with them, and it will be some little time before the official record from Washington is received. They took a pay load of 2,200 pounds up with them, taking off with 200 gallons of gas. They had nearly a hundred gallons left when they landed. If the barograph shows that their altimeter was correct, they will have broken the American payload altitude record. The plane was taken off the line, no preparations or alterations having been made in advance for the flight.

IT seems as though Los Angeles is to have more than its share of Class A Flying Schools in the very near future. The Curtiss Flying Service has one with fine equipment at Los Angeles Municipal Airport, formerly known as Mines Field. The first unit of hangars has just been completed, and it is a



P. &amp; A. Photo

W. H. Bowlus piloting glider which won the distance and endurance events at San Diego

completely fireproof building, with offices and reception rooms equal to any downtown office building. Student instruction has already started at the airport, the first enrollment, I am informed, having nearly forty students.

THE Boeing School of Aeronautics is to open at the new United Aircraft and Transport Corporation airport just outside the city limits on October 1st. The airport, which is nearly ready for occupancy, is the last word in construction. The executive building, hangars and shops are built of steel and concrete, and the flying field itself is oil treated and levelled with runways for landing and taking off in any direction. A large factory and assembly building for the Boeing Aircraft is well under way, as are a number of other buildings. The entire plant is one of which Los Angeles may be justly proud.

THE first regular monthly meeting of the Southern California Chapter of the National Aeronautic Association was held at the Chamber of Commerce building, Monday evening, September 16th. More than 300 persons attended the dinner which preceded an entertainment program. The guest of honor for the evening was Major Clarence Young, Assistant Secretary of Aeronautics for the Department of Commerce, who declared that no other section of the country has been so successful in selling the idea of aviation as a means of transportation as Southern California. Dudley Steele was another speaker for the evening.

## PACIFIC COAST GLIDER MEET AT SAN DIEGO

SIX glider pilots from Long Beach, Riverside and San Diego, Calif., entered motorless planes in the first Pacific Coast Glider Meet, held in San Diego September 1st and 2nd. The meet was sponsored by the Pacific Beach Business Men's Association, and was timed and judged by representatives of the National Aeronautical Association. While no records were broken, the interest of thousands of spectators was held throughout the two-day meet.

The take-offs were made from two hills, one having an elevation of 450 feet, and the other an elevation of 350 feet, above sea level. Thirty-seven flights were made during the two-day meet.

W. H. Bowlus, head of the technical training department of the Airtech School of Aviation, San Diego, received the highest number of points in the meet. Apollo Smith of Long Beach, took first place in the altitude contest for the soarer class, won first place in the endurance event for training or primary gliders and won the distance mark for primary craft. Ray Chesley of Long Beach made the highest altitude for primary planes, and John R. Pierce, of Long Beach, won the cup for landing nearest the mark in a special spot-landing event.

Bowlus made the most extended flight when he stayed in the air for more than one minute and forty-three seconds. During this flight he performed evolutions over part of the crowd that thronged the field. Bowlus

*(Continued on next page)*

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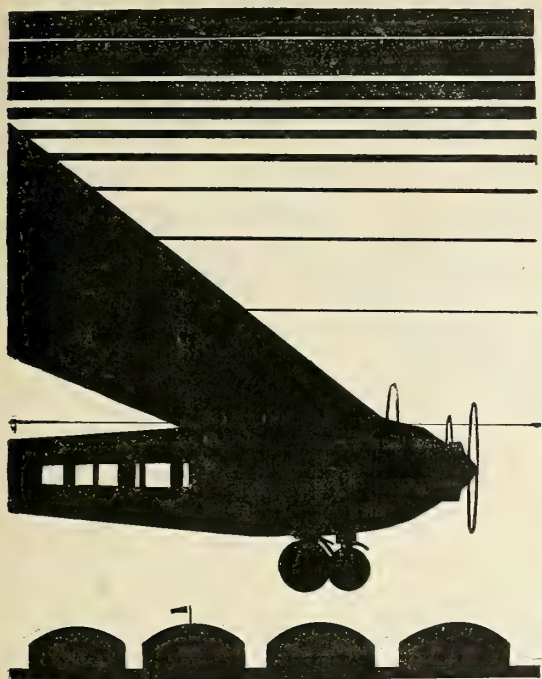
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(Continued from preceding page)  
traveled an air-line distance of 2,925 feet. The following flights were recorded:

Duration: Secondary gliders—W. H. Bowlus, San Diego, 1 minute 43 4/5 seconds; Apollo Smith, 1 minute 16 3/5 seconds; John R. Pierce, 1 minute 3 seconds; A. R. Essery, 25 seconds; Irvin Culver, 18 1/2 seconds. Primary or Training gliders—Apollo Smith, 55 4/5 seconds; James Caruso, 50 1/5 seconds; Ray Chesley, 43 seconds; John R. Pierce, 42 4/5 seconds.

Altitude: Soarer class—Apollo Smith, 72 feet; W. H. Bowlus, 54 feet; John R. Pierce, 42 feet; A. R. Essery, 24 feet; Irvin Culver, 15 feet. Primary class—Ray Chesley, 45 feet; John R. Pierce, 41 feet; Apollo Smith, 40 feet; James Caruso, 37 feet. (The altitude given is the height above starting point obtained by the glider.)

Distance: Soarer class—W. H. Bowlus, 2,925 feet; Apollo Smith, 2,175 feet; John R. Pierce, 2,050 feet. Primary class—Apollo Smith, 2,175 feet; James Caruso, 2,000 feet.

Landing to spot: John R. Pierce, 8 feet; Bill Atwood, Riverside Glider Club, 16 feet; Ray Chesley, 23 feet; Apollo Smith, 217 feet.

## CALIFORNIA

THE Fairchild Aerial Surveys, Inc., of

Los Angeles, California, recently delivered to Los Angeles County an aerial survey, comprising 400 square miles, the entire mainland area of Los Angeles County. The map includes territory running from sea level to over 10,000 feet. Approximately 6,000 negatives were exposed in securing this area and more than 100 hours of flying at elevations of about 15,000 feet was involved in securing the pictures.

The maps are being used by the various departments of the county government for studies in connection with forest fire control, flood control, highway construction, regional planning, horticultural study, and other purposes.

FOUR new buildings, including a new hangar, stock room, machine shop, and motor test building, now under construction on the Los Angeles field of the Aero Corporation of California, Inc., is nearing completion and the building will soon be ready for occupancy. The four buildings are of

fireproof construction, having summer bell roof trussing, corrugated iron siding and asbestos roofing. Concrete flooring amounting to 21,668 feet has been poured for the four new buildings.

The new hangar, 100 by 96 feet, will be in line with another hangar of the same size and adjacent to the machine shop and motor test building with an overhead crane running the entire length of the four buildings. These buildings are being equipped with new machinery and repairing facilities and will be used for authorized factory service on Pratt & Whitney aircraft engines. The new stock room will be 26 by 70 feet.

The motor test building is divided into two compartments, each 26 by 26, with a control room between them. The compartments each have a steel motor stand with exhaust pipes leading outside and controls leading into the control room from where the person testing the motors can operate the motors and see their operations from the windows overlooking the test stands. The stands are interchangeable for Wasp or Hornet engines.

THE California University of Aeronautics operated by California Aerial Transport at Los Angeles recently received all three approved flying school ratings—private, limited and commercial and transport pilot.

HERBERT E. LINDON, president of the American Paulin System, Inc., recently announced perfection of an instrument that will determine the exact altitude of a plane in flight. This new instrument is a combined level flight indicator, altimeter and barometer. The recording instrument may be set before leaving the ground, to the elevation desired.

THE Aero Corporation of California has contracted to supply Hamilton Maxwell, Inc., of Springdale, Connecticut, with flying equipment and personnel for the making of aero maps, surveys and aerial photographs in the territory including California, Arizona, New Mexico, Texas, Utah, Nevada, Washington and Oregon, it was announced recently by Lieutenant Paul E. Richter, Jr., vice president and general manager of the Aero Corporation.

The Hamilton Maxwell Corporation is a contractor for the making of aerial photographs and surveys for industrial organizations as well as city, county and state projects requiring topographical information. Activity in the past has been confined to the eastern section of the country, but demand for services in the West has warranted their expansion to the West and Southwestern sections.

The Aero Corporation of California will not only supply all the flying equipment for work originating in California, but will act as agents for the eastern concern. E. M. Quilici has been named as manager of this department by the Aero Corporation.

THE Fleet Aircraft, Inc., of Buffalo recently received an order for 10 planes from the Airtech School of Aviation located at Lindbergh Field, San Diego, Calif. The Fleet planes to be used by the Airtech School of Aviation are powered with five-cylinder 100-horsepower Kinner engines.

T. S. LUNDGREN has been appointed sales manager of the Emsco Aircraft Corporation located at Downey, Calif. The Emsco organization has started production on its line of airplanes, which, according to plans, will include planes ranging in size from private to transport craft.

ALBERT E. HASTINGS has been appointed sales manager of the San Diego Air Service Corporation, Lindbergh Field, San Diego, Calif., distributors of Fleet planes in south, central and southern California. Mr. Hastings is a recent transport pilot graduate of the Airtech School of Aviation.

THE San Diego Air Service Corporation located on Lindbergh Field in San Diego, California, was recently appointed authorized sales and service representatives of the Wright Aeronautical Corporation. Under the new franchise the San Diego Air Service Corporation will supply all official Wright engine parts. Eugene Fry, retired Naval aviation chief, has been appointed chief of the Wright engine service and supply department of the San Diego Air Service Corporation.

(Continued on next page)

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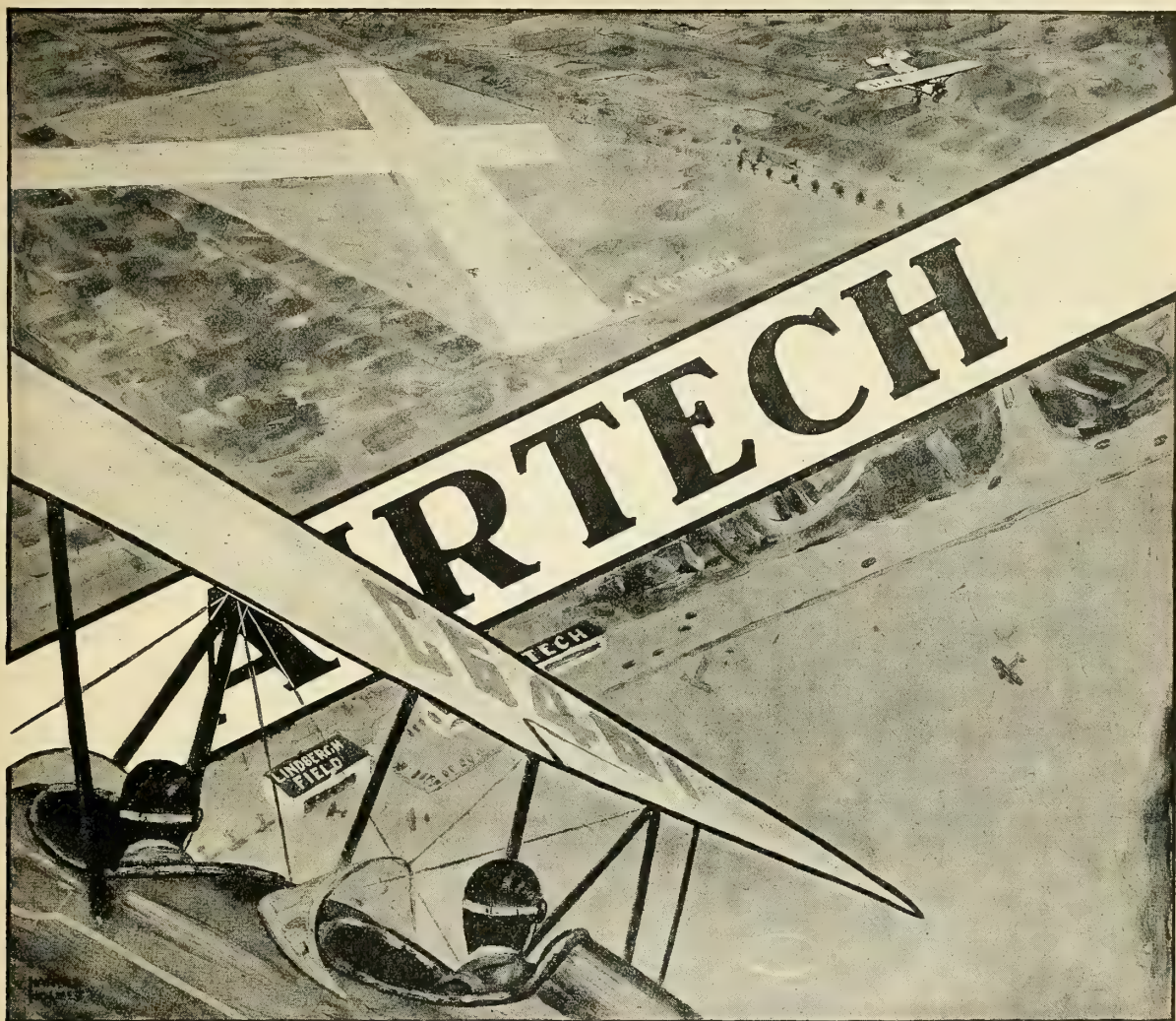
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nicipal Airport. Here, at the focal point of aviation, *Airtech* students complete the thorough training essential to success in modern aviation.

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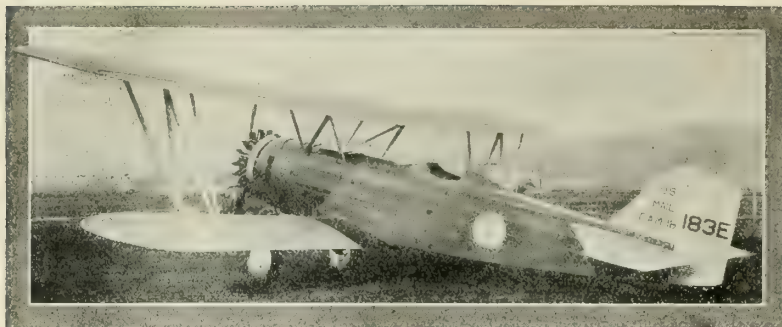
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SAN DIEGO, CALIFORNIA







Boeing mail plane used on the Boeing System's contract air mail route 18

(California News continued)

## OAKLAND

[HOWARD V. WALDORF]

OAKLAND is to be the center of a chain of radio beacons stretching along the entire Pacific Coast, according to an announcement by T. K. Johnson of the airways radio division of the Department of Commerce. Beacons are to be located at Seattle, Portland, Eugene, Medford, Duenmair, Fresno, Los Angeles, Barstow, Kingman, Old Glory, Alcade and Bakersfield. Sites for the beacons are now being selected by a corps of departmental airway engineers. The Oakland beacon, from which three guiding beams are to be broadcast, is to be located near the Oakland airway radio station.

THE Metro Air Service, Oakland Municipal airport has been purchased by the Varney Air Lines. It is to continue operations as an independent unit of the Varney organization, according to Walter T. Varney. Franklin Rose, one of the founders of the company, has been appointed general manager.

A CIVIC celebration marked the opening of the Boeing School of Aeronautics at Oakland Municipal Airport September 16th. The school, headed by Theophilus Lee, Jr., is the first of a nation wide chain in aeronautical colleges planned by the Boeing System. Courses in ground and flying instruction are offered. The school is located in Hangar 5, which was recently completed. Hilton Lusk is dean of the school; other members of the faculty include George Myers, director of flight training, and W. E.

Wright, director of shop instruction. New Boeing training planes and a Hamilton all-metal monoplane are used in flight instruction.

A CROWD of 5,000 persons witnessed the inauguration September 2 of the direct San Francisco-Oakland to New York air-rail service of the Transcontinental Air Transport. The new schedule calls for a connection at Bakersfield with the T. A. T. planes out of Los Angeles, and the East, with Oakland Municipal airport as the terminus of the night westbound landing and Alameda airport as the starting point of the daily eastbound plane. D. W. Tomlinson, vice president of the Maddux Air Lines, piloted the first westbound plane. Ernie Smith, H. G. Andrews, and M. Guglielmeetti have been assigned to the run.

AN application for extensive hangar space at the Oakland Municipal airport has been filed with the Oakland board of port commissioners by the Curtiss Flying Service as the first step in plans to establish a 10-minute amphibion service between Oakland airport and San Francisco. Five Ireland amphibions have been ordered for the service. The landing in San Francisco is to be made in China basin.

A NEW record for air operations at the Oakland Municipal airport was set during the month of August. Figures released by the Oakland board of port commissioners were: Landings 8,025, passengers 6,208, student flights, 1,565. Figures for the previous month were: Landings, 7,137, passengers, 4,349, student flights, 1,050.

In an effort to discover a method of dust-proofing the Oakland Municipal airport,

engineers of the Oakland board of port commissioners are making analyses of the soil of the flying field. Presence of salt water in the soil prohibits use of oil. Work is now underway on oiling the rocked area adjoining the hangars. Surfacing of the remainder of the improved landing area, which now totals more than 240 acres is being withheld pending the outcome of the tests.

HEADED by E. C. Garrett, the American Air Cab Company has been formed at Oakland Municipal Airport. The company is to specialize in cross country flights. The first of a fleet of Fairchild cabin monoplanes, ordered for the service, was ferried from the New York factory by Sidney Du Bose, chief pilot of the new concern.

FORMATION of the Agricultural Aviation Activities, Inc., was announced recently at the Oakland Municipal Airport. The company is to specialize in crop-dusting. Executives include M. M. Smith, Ralph Sanborn, C. L. Moore, W. G. Herron, Capt. Burdette Palmer, all of San Francisco, and Maj. Livingston G. Irving of Oakland. Eaglerock planes are to be used in the work.

## ALAMEDA

[HOWARD V. WALDORF]

THE ground school division of the Curtiss Flying Service was opened at the Alameda airport September 10th. The opening was marked with an elaborate program in which a number of civic and aeronautic persons of northern California participated. The ground school is the first of a series of courses to be given at the Alameda airport by the Curtiss organization.

The faculty of the new Curtiss school includes Capt. W. H. Royle, director of training, Lieut. Allen Bonnalie, Lieut. J. W. Hughes, Lieut. Harvey Greenlaw and Joseph Long. Instruction equipment, including wind tunnels, has been installed in the school headquarters, which adjoins the administration building.

A TOTAL of 412 transport planes carrying 1,870 passengers landed at the Alameda, Calif., airport during August, according to figures released by R. R. Nickerson, superintendent of the field. Statistics for the nine months the flying field has been

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in operation show a total of 7,269 transport passengers. These figures do not include students or sightseers.

Experiments with oil and oyster shells are being made by engineers in preparation to surfacing the Alameda airport. The long runway has been completely oiled and work is under way on covering this oiled strip with shells. A dredge is working day and night to complete the filling contract which will triple the area of the flying field.

**S**URFACING of the San Francisco Bay Airdrome on the western Alameda tidelands is under way and the flying field is expected to be opened to air operations in October. The development work, calling for an expenditure of \$1,000,000 is directed by Lynn Schloss, construction engineer. Work on the construction of hangars and

an elaborate airplane depot is scheduled to start shortly.

## STOCKTON

[RUSSELL GRIGSBY]

**I**ES AND ED. ORANGES have bought 147 acres, 5 miles north of Stockton, on the Lower Sacramento Road, and will proceed immediately to build a modern airport on the land. The field will have two runways each 2,500 feet long, hangars, gas, oil, water, telephone, flood-lights, beacon, boundary and construction lights. It will be a private field, operated for profit.

The Orange brothers have operated a large garage in Stockton, for the past ten years, and are both pilots. They now own a Whirlwind Travel Air biplane.

## HAWAII

[VERNE HINCKLEY]

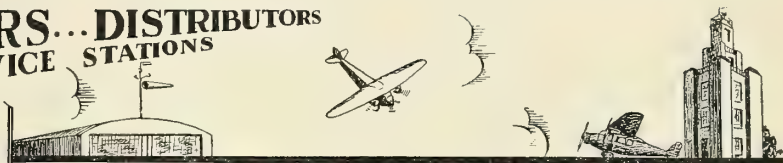
**S**EPTEMBER marked the final preparations for the opening of service by the first two strictly commercial air lines in Hawaiian territory. The Inter-Island Airways, Ltd., utilizing bi-motor Sikorskys, and the Hawaiian Airways Co., Ltd., with Wasp-engined trimotor Fokkers, will inaugurate daily flights out of Honolulu to Hawaii at the southeast and Kauai at the northwest. Both companies make their headquarters at the John Rodgers airport, five miles west of the city of Honolulu. Both are starting hangars there.

The first two of a fleet of 12-passenger Fokker Airliners ordered by the Hawaiian Airways, Ltd., for use on inter-island service

(Continued on next page)

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(Hawaiian News continued)

in the Hawaiian group, will sail for Honolulu on September 30th, and November 10th has been definitely set as the date upon which this company will start operation. William Gibbs McAdoo is general chairman of the Hawaiian Airways board of directors which is composed of men from California and the Hawaiian Islands. Besides Mr. McAdoo, the California directors include Chas. V. Eakin, Nathan Newby, Sr., and Thomas J. Edwards. The Honolulu directors and officers include G. Fred Bush, president; John Mason Young, vice president; Frank O. Boyer, secretary, and Worth O. Aiken, treasurer and general manager.

Leases have already been taken on five flying fields on the islands, and construction has commenced on shops and terminal facilities. In addition to the five leased fields, the company has been offered the use of ten government fields on the islands.

The Inter-Island Airways is headed by Stanley C. Kennedy, an officer of the Inter-Island Steam Navigation Co., the parent concern, and a naval aviator during the world war.

As yet no contract for carrying United States mails between the islands has been awarded. Members of the Hawaiian Department of the American Legion, at their recent convention, went on record in the form of a resolution as favoring the promulgation of such a contract by the post-office department.

**L**IEUT. HAROLD R. RIVERS, who has completed more than four years of service in the Hawaiian department, has been ordered to Selfridge Field, Mich. For two years he was commanding officer of the 11th Photo Section, Luke Field. Lieut. C. S. Thorpe, of the 72nd Bombardment Squadron, also at Luke Field, has been ordered to March Field. Staff Sgt. Cecile B. Guile, the only enlisted pilot in the department, also is to go to Selfridge Field. He has been with the 4th Observation Squadron.

Among the new army air corps officers in the department are Lieut. James Laird and Lieut. Fred Stocks. The former comes from Wright Field where he has been for a number of years in engineering and experimental work.

**T**HE army airport at Hanapepe, Kauai, became available for the use of commercial ships on Sept. 1st. The permit for such use was received from Patrick J. Hurley, assistant secretary of war. The field, one of the best on Kauai, has been considerably improved by the Army Air Corps.

**P**LANs for the enlargement of Wheeler Field are not to be approved by Air Corps officials at Washington for some time, it has been learned. The proposals, which involve the expenditure of \$2,000,000 have been passed back and forth between the Hawaiian department and the national capital

several times. Each time changes and suggestions were made at Washington. A portion of the plan involves the re-routing of the main highway around the Island of Oahu, which, as it stands today, cuts directly through the area which it is hoped to add to the field. Territorial, city and county officials have given their approval to a change in the route followed by the road.

## ARIZONA

[HAROLD G. WILSON]

**T**HE Apache Airlines, of Globe, Ariz., has been granted permission by the Arizona Corporation Commission to operate a scheduled passenger and express plane service daily between Phoenix and the Globe-Miami district. Incorporators of the new company are Harold W. Alrich and Ralph G. Vaughn. A six-passenger monoplane will be used for the line and the trip will be made in 35 minutes.

**T**HE Corporation Aeronautica de Transportes, of Mexico, known as the C. A. T. line, has ordered 21 planes for additions to their present equipment. They operate from Nogales, Ariz., to Chihuahua by way of Cananea, at which point passengers are transferred to planes which operate between Juarez and Mexico City. Twice-a-week service over the line has been maintained for some time, but with the delivery of the new planes, this will be increased to tri-weekly, then daily, service.

(Continued on next page)

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NOTE: Mr. Ryan is the original designer and builder of Ryan monoplanes; founder of Ryan Airlines, Ryan Flying Company; president of T. C. Ryan Flying School and T. C. Ryan Aeronautical Corporation.

**L**EADERS IN THE INDUSTRY agree that one of the most serious problems confronting the progress of commercial aviation is the lack of men who *know* aviation. This is true because this great industry needs a personnel with highly specialized knowledge and training.

In the future, airline executives will be made up principally of men promoted from active piloting positions—because those men *have the intimate knowledge* that will enable them to successfully handle operations, airplanes, and flyers.

*How and Where can I receive real aviation training?*—is the question confronting the young man who wishes to make aviation his career. Col. Lindbergh recognized this when he said:

"There are many schools which advertise that they will teach a novice how to fly . . . usually turning out the student as a finished pilot after ten hours in the air. Ten hours of flying will not make anyone a pilot. . . . A great many serious aviation accidents occur because of pilots who are turned out of cheap schools without sufficient experience to meet emergencies."

In view of these conditions, my advice to prospective students is:

- (1) Select a school with a reputation. It is easier to make good connections after graduating from a prominent aviation school.
- (2) Select a school that will give you training in at least five or six different types of licensed airplanes. Open and closed types, monoplanes and biplanes, large and small, are desirable.
- (3) The course should be given under the careful direction of expert instructors. It should cover every point in flying that a pilot can be taught. Special emphasis should be given to extensive practice in forced landings in every type of field; cross-wind landings; normal aerobatics; extensive cross-country flying with practice in aerial navigation over mountains and water; and practice in "blind" instrument flying.
- (4) Sound ground training is very important. A completely equipped ground school, with extensive equipment, shops and laboratories is essential for complete aeronautical training.
- (5) Select a school that is located where there are extensive and varied aeronautical activities—so you may come in contact with as many phases of aviation as possible during your training period.
- (6) Learn to fly where conditions enable you to train without loss of time or danger due to storms or other unfavorable weather.

This type of training will qualify you for all U. S. Government Licenses and gives you a decided advantage—even placing you ahead of old-time flyers who have not had such complete and thorough training.



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Name ..... Address ..... Age .....



(Arizona News continued)

THE date of the dedication of the Florence municipal airport, previously announced for earlier in the month, has been changed to October 12. A morning program will be held at the local woman's club with the dedication program at the airport in the afternoon.

AIRPLANE models made by youths of Phoenix were judged recently at the Hotel Westward Ho during the visit of the women air pilots on their way from Santa Monica to Cleveland. A Curtiss Hawk, designed by William Burson, won first place in the contest with Harry Pryor's Curtiss NC-4 winning second place. Mrs. Louise Thaden and Mrs. Blanch Noyes were among the judges.

THE Roberts Aircraft Corporation has leased half of a plant at Phoenix, and is remodeling it as an assembly plant for the manufacture of the Sparrow-Hawk all-metal biplane. The company plans to produce one plane a day when its facilities are completed.

AN aerial fete was combined with the annual Mexican Independence Day celebration at Nogales, September 14-16, a large number of planes gathering there for the event. Nogales is now served by Pickwick Airways to Mexico City and Los Angeles, and by C. A. T., which connects with

the interior of Mexico. A line north through Arizona is contemplated by the Southwest Air Service, Tucson corporation, which has already been given a permit to establish the line.

THE Phoenix Sky Harbor, established and developed by Scenic Airways, Inc., was dedicated on Labor Day with between 8,000 and 10,000 persons present. Lloyd Weeter is general manager of Scenic Airways.

A. A. Congleton, former U. S. Navy flier, has been named instructor of the Bisbee school operated by Scenic Airways. Charles Goldtrap, formerly in charge of the school, has been transferred to Phoenix to take charge of the larger school, but makes regular weekly trips to Bisbee.

SCENIC AIRWAYS INC., with offices in Grand Canyon, and Phoenix, Arizona, and El Paso, Texas, operates Ford trimotor planes for regular scenic tours over the Grand Canyon, the Indian country, and other scenic attractions of the southwest, from its airport fifteen miles south of the El Tovar hotel on the south rim of the Canyon. It also operates flying schools and taxi service from its \$250,000 airport at Phoenix, and similar activities from the municipal airports at Bisbee, Arizona, and El Paso. The company has maintained an operating record of no forced landings due to mechanical trouble, in more than 3,000 hours of flying.

## NORTHWEST

[F. K. HASKELL]

IN connection with the inauguration of the new mail service of the Varney lines between Portland and Pasco, started September 15th, the first plane to be used by the Varney Air Lines on its Pasco-Salt Lake route was exhibited at Portland, Ore., in the post office grounds to stimulate the use of the new air mail service.

FLYING 30,000 miles at 150 miles per hour in a 200-hour test, a Speed-Mail plane owned by the Varney Air Lines recently completed an unusual speed and endurance trial at Boise, Idaho. The plane was flown at a wide-open speed of 150 miles per hour every day from 5 a.m. to 9 p.m. for two weeks.

No attempt was made for sustained and continued flight, the plane coming to earth for refueling and to change pilots. The flight was made for the Wright Aeronautical Company to test the Wright Cyclone 525 horsepower engine. These engines will be used on the new air mail route which the Varney Company will operate between Pasco and Salt Lake City.

H. S. WILSON, C. A. Anderson and Ben H. Hathaway have opened an airport at Tilamook, Ore., where they will also operate a commercial air service.

(Continued on next page)

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(Northwest News continued)

WITH the Yukon Territory as its field, the Yukon Airways and Exploration Company, Ltd., has commenced operations with a Ryan Brougham plane. The company was formed recently with W. A. Puckett, president, to provide mail passenger and light freight transportation facilities between White Horse, Mackenzie River and Telegraph Creek points.

**SPEEDING** at a rate of 95 miles an hour, an airplane piloted by R. C. Graham of Bellingham, Wash., seeded 160 acres of land on Lummi Island in one hour and 40 minutes. The seed was fed to the air from a sack in a six-inch stream, using about 800 pounds of seed. The plane flew 500 feet off the ground.

**SPEEDS** of 152¼ and 150 miles an hour were recorded by a new Portland-built Breeze plane in recent tests on a one-mile course over the Port of Portland airport. Vance Breeze is pilot and designer.

**AERIAL** photographs taken of Mt. Rainer by Captain A. W. Stevenson and Lieut. J. A. Cockile, from a point south of Three Sisters have proved successful. The distance of the pictures is 205 miles, a long distance record for aerial photographs.

**KLAMATH FALLS, ORE.**, recently voted \$50,000 in bonds for the construction of a modern airport in that city.

**THE** Bremerton Air Ferry, operated between the Navy Yard and Seattle, has carried 10,000 passengers since the service was inaugurated by Verne C. Gorst on June 15, 1928. The 9-passenger Loening amphibion plane, piloted by Clayton Scott, makes 24 nine-minute trips daily.

## WASHINGTON

(C. M. LITTLEJOHN)

**A** SMALL airport is being completed at Colville, under the guidance of city councilmen, American Legionnaires and members of the Colville chamber of commerce. About 100 acres of level land adjacent to the city is being developed for the new airport.

**NEW** maps are to be made of Seattle by airplane. The city council has appropriated \$4,500 for the purpose of mapping the city and its environs. Each section will be made in detail and then assembled on a scale of 200 feet to the inch.

**A** NEW Seattle-Tacoma air service has been inaugurated by the Alaska Washington Airways of Seattle which flies the route between these two cities in twenty minutes. The Tacoma service was started September 8th with the Lockheed Wasp Vega seaplane Juneau, the flagship of the company's fleet. Floyd Keadle, former army aviator, piloted the plane. On the return from Tacoma, the Mayor of Tacoma and

other city officials visited Seattle, in celebration of the inauguration of the new air line.

**MAMER AIR TRANSPORT COMPANY** has opened a new direct air transport service between Seattle and Spokane, via Portland and Yakima. Daily except Sunday service is being maintained. Trimotored twelve-passenger Ford planes are used.

**CAPITALIZED** at \$200,000, the Gryphon Aircraft, Inc., was recently incorporated at Seattle, Wash. Incorporators of this new company are John V. Janin, C. A. Palmer and W. H. Stewart.

**AIRPLANE** service between Seattle and Victoria, B. C., was recently resumed when a six passenger seaplane operated by the Alaska-Washington Airways started its flight from Lake Union, Seattle. A four-hour trip by boat is now covered in forty-five minutes by air travel time between the two points. Planes leave on a daily schedule at 11 in the morning and 5:30 in the afternoon from the Seattle hangar, and at 9:30 A. M. and 1:30 P. M. from Victoria.

**TO** manufacture aviation products and a new airplane motor, the Aero Products Corporation, newly organized, recently took over a plant at Seattle. The company was incorporated for \$400,000 by N. B. Randall,

(Continued on next page)

# LEARN TO FLY



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| Nicholas-Beazley<br>Airplane Co., Inc.,<br>Marshall, Mo.                             | Johnson Airplane & Supply<br>Co.,<br>Dayton, Ohio.                                     |
| Universal Aviation Corp.,<br>(Robertson Aircraft Corp.,<br>Division),<br>Anglum, Mo. | Logan Aviation Co.,<br>716 W. Superior Ave.,<br>Cleveland, Ohio.                       |

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City..... State.....



(Washington News continued)

Larned E. Meacham, G. B. Groff, John McQuade, W. H. Casebeer, M. V. Johnston, Francis Rodrigues, W. A. Anderson, F. A. Woolrich, H. W. Hargood, J. E. McKay, C. A. Wamba, W. M. Cote and J. M. Wamba.

A NEW administration building has been opened in Seattle as headquarters of the Boeing Airplane Company. This three-story structure houses the offices of the Boeing plane organization as well as the offices of Pacific Coast and transcontinental air services.

## UTAH

[GLEN PERRINS]

SALT LAKE CITY'S airport is the junction of airways between the Pacific Coast and the middle west. Hangars now number 14, and about 150 students are now in training at the airport. The inner field is surfaced, drained and oiled, allowing runways of from 2,500 to 5,000 feet. Landings average about 3,000 monthly.

BOEING AIR TRANSPORT, INC., led all other airmail carriers of the country in poundage carried and miles operated during May, June and July. Poundage for the Boeing line was as follows: 150,947 in May; 148,487 in June and 157,502 in July. Air mail carried by the Boeing system during the first seven months of 1929 was

about two and one-half times as much as was carried in the same period of 1928.

COMPLETE removal of the Boeing Air Transport, Inc., operations and traffic department headquarters from Salt Lake to Cheyenne, Wyoming, has taken place. The principal officials affected by the removal are: D. B. Colyer, vice president, in charge of operations; F. E. Caldwell, superintendent of operations; W. A. Patterson, general traffic manager; A. G. Kinsman, manager of passenger traffic; Russel Le Brock, manager of mail traffic, and R. C. Wright, auditor.

PASSENGER and express service by air between Salt Lake and Ely, Nevada, was started recently by the Seagull Air Lines, according to C. W. Parry, vice president and general manager. Ely has a modern, though small, airport. The trip is made in two hours and fifteen minutes, using Curtiss Robin and Travel Air planes.

The Seagull firm has also started passenger and express service to Uintah basin from Salt Lake City.

Work will be started immediately on a landing field at Vernal, Utah, and three emergency fields between Salt Lake and that point, preparatory to opening an air line between the two towns.

NEGOTIATIONS are completed for establishment of an air line between Nogales, Arizona, and Salt Lake, according to J. E. Kintner, general manager of the Scenic Airways, Inc., operators of air

taxi and bus service in Arizona. A daily air service with Ford tri-motored planes is planned, to start October 1.

WORK on the Logan-Cache airport at Logan, Utah, is progressing rapidly. The grading is complete and plans for a program for the official opening in the near future are prepared. The opening date will be a general holiday. The site of the new airport is about three miles north and west of the city.

WORK has been started on leveling the Myton, Utah, landing field following inspection of the site. The field is located one mile east of the city and is owned by the city. It is close to the Duchesne river.

ACCEPTANCE of the Las Vegas-Salt Lake section of the airways lighting system by the government is announced. The entire line from Salt Lake to Los Angeles has now been completed and accepted. There are 96 beacons between Las Vegas and Salt Lake. The Burley, Idaho, Salt Lake line is nearing completion.

## IDAHO

[GLEN PERRINS]

A SPECIAL election has been called by Burley for the latter part of September to authorize the issuance of \$10,000 in bonds to purchase airport ground. There has been \$750 advanced as part payment on the grounds by the local airport committee. There is still \$7,300 due.

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HAL SMITH, Dept. Mgr.

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10,000 Yards Government specification grade AA fabric.....	43c per yd.
2,000 Hatot, Zenith, Taylor, and Neco Altimeters, 26,000 foot register, 3 1/2" dial.....	\$7.50 to \$15 ea.
50,000 A. C. Rajah, Splittorf, Bethelene, and other makes of airplane spark plugs.....	25c ea.
800 Liberty cylinders.....	\$40.00 ea.
2,000 OX5 connecting rods.....	\$1.50 ea.
10,000 Connecting rod bolts.....	.6c ea.
80,000 OX5 exhaust and intake gaskets. In lots of 1,000.....	3c ea.
Government specification safety belts.....	\$3.75 ea.; worth \$7.50
800 Pounds brass peel shims for all bearings on OX5 motors.....	10c ea.
OX5 cylinders.....	\$20.00 ea.
100,000 Government specification bolts and nuts.....	3c to 12c ea.
100 Straight side wire wheels.....	\$8.00 ea.

#### MOTORS

50 Model H-3 NEW Hissco motors, 300 h.p.....	\$750.00 ea.
New Siemens-Halske, 9 cylinder, 125 h.p.....	1,200.00 ea.
New Velie, 5 cylinder, 60 h.p.....	650.00 ea.
New Hallett, 7 cylinder, 140 h.p.....	1,250.00 ea.
New latest model Kinner.....	1,250.00 ea.
Late model Anzani, 80 h.p., mechanical valves.....	450.00 ea.
Late model Anzani, 45 to 60 h.p., mechanical valves.....	450.00 ea.
J4 Whirlwind with extra parts.....	1,250.00 ea.
Model A Hissco, good condition, complete.....	250.00 ea.
Liberty motors, good condition.....	250.00 ea.
K-6 motors, good condition.....	350.00 ea.
VXX2, 8 cylinder Curtiss, 200 h.p.....	250.00 ea.

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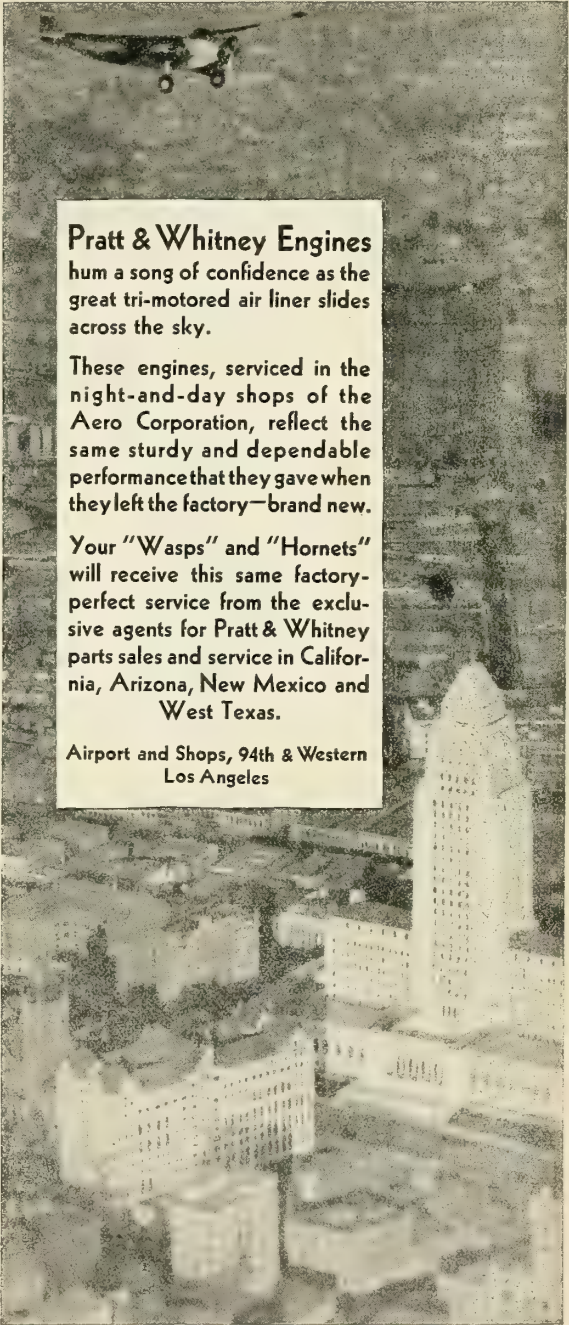
**J**oe says, "Fly an Arrow Sport and you'll smile with satisfaction — satisfaction with the Arrow's speed... safety... maneuverability... visibility... clean cut lines, and other fine qualities."

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# WHAT IT Means to to be



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**N**O matter how you look at it, learning to fly is a business proposition. An investment. A matter of dollars and cents.

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Will you have a job? Will you have the contacts through which you can get a job? Above all, will you have the foundation to enable you to keep up?

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First . . . Curtiss training. Founded on Army and Navy flying methods. Formulated from the specialized knowledge of the best engineers, the best designers, the best fliers. Carried out by instructors specially trained as *teachers*.



Second . . . Curtiss facilities. Training planes like those used in Naval aviation schools. Motors, ships and shop equipment of every type and kind. All the facilities of an organization maintaining 40-odd branches.

Third . . . Curtiss associations. Daily contact with every branch of flying . . . air mail, transport, contract work, charter work, field administration, sport flying . . . a chance to see the inside of aviation in all its present activities.

Finally . . . Curtiss thoroughness. Individual attention to students. Frank elimination of students unable to make the grade. Practical combination of experience and instruction through alter-



(Above) JUST A BEGINNING. The bustling activity of the average flying field of today gives you a hint of what the future holds. (Upper right) TALKING IT OVER. Here's a Curtiss pilot talking over the lessons learned in a training flight while his fellow student listens in.

## CURTISS FLYING SERVICE

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nating class-room and flying periods. *Training broader and more complete than government regulations call for.*

You can learn to fly in many schools at lower first cost than at Curtiss. But you cannot get a *flying education* that is as complete anywhere else. And nowhere can you get as much for each dollar invested.

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# AERONAUTICAL INDUSTRY

## STANDARDIZATION FOR ECONOMY

By Robert Insley, Chief Engineer, Aeronautical  
Division, Continental Motor Corporation

THERE has been such rapid scientific development in the past few years that most people are no longer surprised at anything which science may produce.

Going back over the history of transportation, we may find facts to enlighten the subject of scientific development. Apparently, few people ever felt the need for express shipments before the invention of the steam locomotive, the first appearance of which sent horses wild, children screaming and grown folks running. Few thought they wanted to send letters until the penny postage was established. These new ideas were forced upon the staid, old world. There was nothing attractive about them until their gradual rise made them essential factors in civilized life.

Introducing aeronautics is different. We are living in a fast age—speed is a golden word. There is already established a strong need for greater speed in delivery of mail and express and for more rapid passenger transportation. Together with the established economic value of rapid transportation, the subject of aviation is attractive and appealing from the outset. There are none of the old barriers to break down. Flying for flying's sake is filling aviation schools with youths, who are literally propelling the industry into economic life. Influenced by its attractiveness, they are drawing it into the groove of utility. To forecast the distance aviation will travel into the realm of our civilization is difficult, but we do know that the road is being paved.

Much of the tremendous advance made in aircraft design during the last two years has been made possible by the development of new engines to meet the increased demand. But so fast has the industry grown and so great has been the demand for engines, that the supply of available power plants has not been sufficient. Many aircraft manufacturers have been unable to lay out progressive programs because of their inability to obtain equipment; in fact, some of them have had five or six different en-



Robert Insley

gines which they are prepared to furnish.

This multiplicity of engines for any make of plane, arisen out of necessity, obviously is uneconomical. Every time a different engine is used the fuselage must be altered to provide the proper mounting and the cowl must be suited to each power plant. Moreover, the variation in power of the available engines influences the design of the aircraft, increasing the number of models and thus dividing production and making standardization difficult. The cost of such operation is apparent.

Standardization must come and the principal point will be the power plant. Instead of offering a number of engines with varying characteristics, it will be advisable to select an engine which, when associated with the plane design, will give the best results in speed, load and economy. Then it will be a matter of selling on a performance and price basis.

### Universal Parts and Supplies Sales

IN a report issued by the aeronautical parts and supply department of Universal

Aviation Corporation at Lambert-St. Louis Flying Field, the sales for the first seven months of this year showed a 436 per cent increase over the same period of 1928. The sales in July bettered the same month in 1928 by 368 per cent.

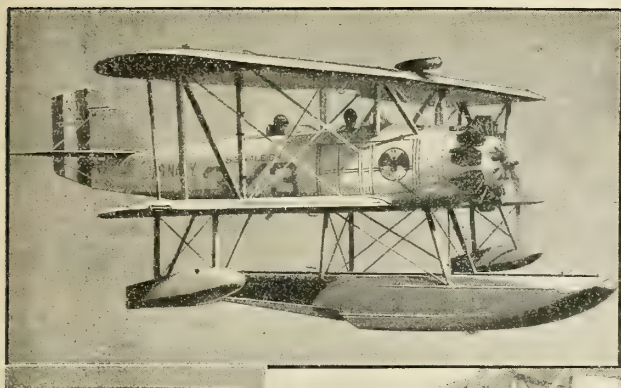
## AIRPORT CONFERENCE OF A. R. B. A. AND A. C. C.

SUBJECTS of interest to airport executives form the basis of the program prepared for the municipal airport conference to be held jointly by the American Road Builders' Association and the Aeronautical Chamber of Commerce of America in Washington, October 24-25. The program of the meeting will be as follows: "Airport Layout and Planning" will be discussed by B. Russell Shaw, of St. Louis, Mo.; "Airport Drainage" will be handled by C. A. Hogenotger, senior engineer of the Bureau of Public Roads; a discussion of "Airport Surfaces" will be given by C. N. Conner, engineer executive of the American Road Builders' Association; A. P. Taliaferro, Jr., chief of the field service section of the aeronautics branch of the Department of Commerce, has accepted an invitation to present a paper on "Airport Management"; a paper on "Airports and Public Parks" is to be given by Lieutenant Colonel U. S. Grant, III, director of the system of public buildings and public parks of Washington and the District of Columbia; and a paper on "European Practices" will be presented by Colonel Clarence M. Young who assumes the office of Assistant Secretary of Commerce for Aeronautics October 1.

SHIP-TO-SHORE plane service was put into routine service recently when two transatlantic steamers sent planes ahead into New York City with mail. The French liner *Ile de France* sent its Cams 37 amphibian ahead when 30 miles at sea. The plane landed in the Hudson river four hours ahead of the ship. The North German Lloyd liner *Bremen* catapulted its Heinkel H. E. 12 low-wing monoplane into the air when 200 miles at sea, and the plane arrived in New York nine hours ahead of the liner with mail and customs papers. According to plans of the  
(Continued on next page)

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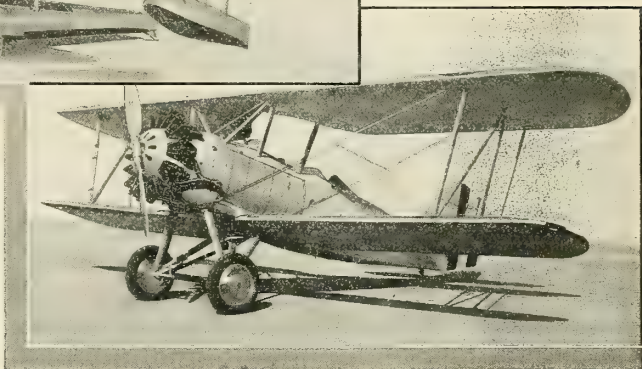


Seaplane



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# Corsair miles in the air are in the millions

In all three types, Corsairs enjoy a military background of trustworthy performance which may well serve as a guide to the purchaser seeking the highest grade ship for commercial or sport use. Corsairs have rapid climb, an exceptional speed range and ease of control peculiarly their own.

As seaplanes, Corsairs thrive under exacting service with the Navy and Marine Corps. As amphibions, developed for use on the new aircraft carriers, Corsairs offer all the

speed, performance and control of their famous line.

As landplanes, Corsairs are giving an equally fine account of themselves. Acceptable enough in ordinary flying, Corsair characteristics are doubly welcome when coming into or taking off from small fields with heavy loads.

Powered with the dependable Wasp engine the Corsair is the ideal ship—not alone for military purposes, but for commercial and private use as well.

## CHANCE VOUGHT CORPORATION

DIVISION OF UNITED AIRCRAFT & TRANSPORT CORPORATION

Long Island City, New York



(Continued from preceding page)

North German Lloyd firm the distance from shore of the take-off will be increased until the plane leaves the ship 600 miles at sea.

## YOUNG APPOINTED AERONAUTICS CHIEF

**P**RESIDENT HOOVER recently appointed Colonel Clarence M. Young, now director of the aeronautics branch, Department of Commerce, to be Assistant Secretary of Commerce for Aeronautics, succeeding William P. McCracken Jr., who has resigned to engage in the practice of law in Chicago.

Announcement of the appointment was made at the White House following a conference between the President and Mr. McCracken. Mr. Young will assume his new position October 1st.

## LABOR STATISTICS OF THE AVIATION INDUSTRY

**A** TOTAL of 22,082 persons are employed in the construction of aircraft, according to a survey recently made by the Bureau of Labor Statistics of persons in the aeronautic industry as of May, 1929. Information was received from 97 companies making airplanes, four making airplanes and engines, and 19 engaged in the construction of engines only. The 101 firms manufacturing airplanes had on their pay rolls 16,105 employees, while the 23 firms making motors employed 5,977 persons; a total of 22,082.

Plants making airplanes are found in 29 States, New York being the most important with 4,396 employees. This is followed by California with 1,605 employees. Other States with over 1,000 persons employed in the making of airplanes are Michigan, Washington, Kansas, and Ohio. Of the 101 firms reporting as engaged in airplane production, 78 turned out planes in 1928. These 78 establishments were located in 24 states and manufactured 4,886 planes. Of these, 1,020 were built in New York, 858 in Kansas, 821 in Ohio and 470 in Missouri.

The industry also gives employment to much labor, both directly and indirectly, aside from manufacturing. Factories and hangars, pilots, both mail and commercial, must be employed; and schools of instruction are employing a large number. Many mechanics and other ground employees are needed at air fields. Employment also is given to persons engaged in the manufacture of the materials.

### Curtiss-Keys Starts Cuban Activities

**C**UBA'S first commercial flying service and general aircraft sales agency has been established by the newly-organized Compania Nacional Cubana de Aviacion Curtiss, with headquarters in Havana, under the sponsorship of the Curtiss-Keys group of aviation companies. Piloted by Ray Applegate, vice president of Cuban Flying Service, and James P. Farnham, technical advisor, two Fairchild planes flew to Havana, Cuba, from Roosevelt Field, Long Island, to inaugurate the service. Charles M. Ewan,

pilot and cameraman, will be in charge of aerial photographic, survey and mapping operations.

## SCHEDULE OF COMING AERONAUTIC EVENTS

September 30-October 4. American Legion National Convention and Aircraft Show, Louisville, Ky.

October 5-21. National Air Tour for The Edsel Ford trophy.

October 12. Air Races, Salem, N. H.

October 29-November 22. World Engineering Congress, Tokio, Japan.

October 31. Guggenheim Safe Aircraft Competition closes.

November 9-16. Western Aircraft Show, California Aircraft Exposition Association, Los Angeles, Calif.

January 13, 14, 15. Miami All-American Air Meet, Miami, Florida.

February 7-15. Second Annual New York Aviation Show, Aviators Post No. 743, American Legion, New York City, N. Y.

April 5-13. Third All-American Aircraft Show, Detroit Board of Commerce, Detroit, Mich.

May 3-10. New York Aircraft Show, Aeronautical Chamber of Commerce, Madison Square Garden, New York City, N. Y.

### William H. Miller Elected to Royal Aeronautic Society of Great Britain

**W**ILLIAM H. MILLER, chief of research for the Berliner-Joyce Aircraft Corporation, Baltimore, Md., was recently elected an associate fellow of the Royal Aeronautic Society of Great Britain. Mr. Miller is the third American aeronautical engineer to receive this honor from the English society.

Mr. Miller was graduated from the University of Missouri in 1920 and served as graduate assistant in aeronautics at Massa-



William H. Miller

chusetts Institute of Technology where he received his Master of Science degree in aeronautical engineering in 1922. Upon graduating from the Institute he was placed in charge of the aerodynamics section of the Curtiss Aeroplane & Motor Company, Garden City, Long Island, where he remained until joining the staff of the Berliner-Joyce Aircraft Corporation early this year.

## AIRPLANE LICENSES SHOW INCREASE

**T**HERE is a total of 7,287 aircraft in the United States, of which 4,232 are licensed and 3,055 identified, according to a recent report of Clarence M. Young, Director of Aeronautics for the Department of Commerce. New York leads in the number of aircraft with 1,006, of which 758 are licensed and 248 identified. California has 896—518 being licensed and 378 identified. The other States which lead in the ownership of aircraft include Illinois, for which 299 licensed and 247 identified aircraft are listed; Pennsylvania, 244 licensed and 117 identified; and Michigan, 235 licensed and 140 identified. Forty-three licensed and 21 identified planes are listed for Connecticut and 97 licensed and 74 identified for New Jersey.

California has 1,167 licensed pilots, while New York has 551. Illinois has 312 licensed pilots, Pennsylvania 205, Michigan 297, New Jersey 115 and Connecticut 52. A total of 877 airplane mechanics from California are licensed, 459 from New York, 375 from Illinois, 280 from Pennsylvania, 307 from Michigan, 178 from New Jersey and 43 from Connecticut.

### Full Coverage Plane Insurance Announced by Hartford Companies

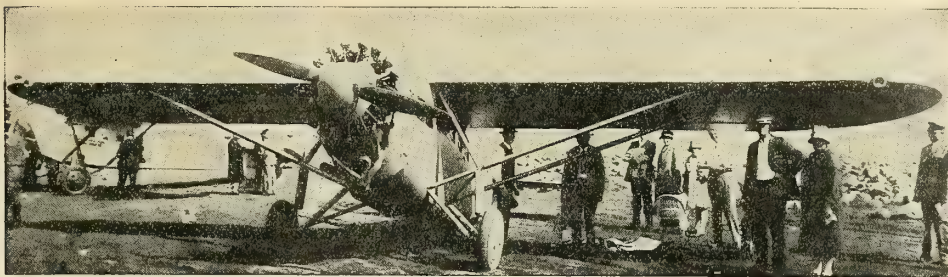
**T**HE Hartford Fire Insurance Company and the Hartford Accident and Indemnity Company announced recently that they will write full coverage in aircraft insurance lines. Their policies will be underwritten by the United States Aviation Underwriters, Inc.

The accident and indemnity company will issue three policies: legal liability for injuries to, or death of, public; injuries to or death of passengers, and damage to property of others. It will also cover workmen's compensation. The fire insurance company will cover fire and lightning while in flight, and transportation, accidental damage, tornado, earthquake and theft while not in flight. The accidental damage covers the descent and ascent of a plane.

### Lockheed and Ryan Sales Report June 1 to August 30

**T**HE Lockheed Division of the Detroit Aircraft Corporation recently reported net sales of \$383,193 for the period from June 1 to August 30. These sales include seven planes in June, five in July and 13 in August, or a total of 25 for the period.

The Ryan Division of Detroit Aircraft reported sales of 27 planes during the same period for a total of \$302,078, including parts and special equipment.



# Reduce the Noise

*with*

## **MICARTA Propellers**

THE din and roar of the propellers constitute one of the annoyances of aerial transportation. Propellers differ, however, and a remarkable difference is noticeable in ships equipped with Micarta propellers.

This quietness of Micarta blades is due, primarily, to the fibrous character of Micarta which results in absorption of the vibrations caused by torque and thrust irregularities—the common cause of flutter.

Micarta propellers are made of fabric treated with a synthetic bond and are molded to exact dimensions, with correct angle, track, width and thickness to attain the highest efficiency. They are unaffected by atmospheric conditions, salt water spray, or oil. The pitch may be adjusted to suit flying conditions.

Write for detailed information on Micarta products for the aviation industry.

WESTINGHOUSE ELECTRIC & MFG. COMPANY  
EAST PITTSBURGH PENNSYLVANIA

SALES OFFICES AND SERVICE SHOPS IN ALL  
PRINCIPAL CITIES OF THE UNITED STATES



# Westinghouse

T30698

#### *Aircraft Accessories*

Micarta Propellers  
Micarta Control-wire Pulleys  
Micarta Fairleads  
Micarta Hinges  
Micarta Sheeting for Cabin Finishing  
Micarta Tail Skid Wheels

#### *Airport Lighting Equipment*

Chromilite Landing Field Floodlights  
Boundary, Approach and Obstruction Lights  
Hangar Lights  
Reflectors  
Transformers and Motor-generators



## JULY AERONAUTICAL EXPORT REPORT

**T**WENTY airplanes, seaplanes, and amphibians valued at \$342,122 were exported during July as compared with 48 at \$812,004 during the preceding month, according to figures compiled by the Aeronautics Trade Division of the Department of Commerce. Of the July shipments, eight valued at \$68,756 went to Canada, five at \$59,900 to Mexico and three at \$54,221 to Japan. Brazil was the country of destination for two airplanes valued at \$74,000. June was the peak month for all time in point of aircraft exports from the United States, when 13 went to Canada, 12 to Mexico and 10 to Chile.

The Commerce Department figures show that during the first seven months of the year 267 aircraft were exported at a total value of \$4,445,075. During the whole of 1928 only 162 planes at a valuation of \$1,759,653 were shipped abroad and 1928 was the previous record year. Leighton W. Rogers, Chief of the Aeronautics Trade Division, states that aircraft manufacturers should export at least ten per cent of production. Last year the ratio of exports to production was less than four per cent. This

year with the increased manufacture of aircraft the ratio will not be appreciably larger in Mr. Rogers' opinion, but he believes there is a trend toward a higher export percentage because of increased interest in foreign markets on part of both large and small producers.

Exports of engines for aircraft increased over June, 50 valued at \$163,081 being shipped during July as compared with 29 valued at \$111,827 during the previous month. Mexico imported 23 of the July engine shipments valued at \$43,300, with Panama and France following as markets for airplane engines, buying fourteen valued at \$88,466 and three at \$10,853 respectively. Australia received two engines during July.

Aircraft parts and accessories shipped from the United States in July were valued at \$230,719—an increase of \$23,704 over the June exports. Canada was the leading market with \$77,545. Soviet Russia was second in importance with parts and accessories shipments totaling \$72,769. Japan took parts valued at \$8,806, Peru \$7,589, Brazil \$3,200, Argentina \$828, and the United Kingdom \$9,744.

## REGULATIONS FOR AIRCRAFT ENTERING CANADA

**R**EGULATIONS governing the entry of American airplanes into Canada were recently made public by the Department of Commerce. According to the report the following regulations must be observed by pilots flying into the dominion:

The aircraft must be registered and passed as airworthy by the United States Department of Commerce, Aeronautics Branch, and it must bear the registration markings allotted it by that branch, preceded by the letter "N."

The certificate of registration and airworthiness must be carried on board.

The pilot must be duly licensed by the United States Department of Commerce.

If the aircraft and pilot are licensed to carry passengers, they may do so internationally, but not between points in Canada, except in the case of through passengers making a landing en route.

American pilots may not engage in commercial aviation in Canada, nor may aircraft be employed on such work unless registered in Canada.

The pilot of the aircraft is required to notify the Collector of National Revenue at, or nearest to, the landing field at the point of destination, and such notification shall be given prior to taking off, in order that sufficient time may be afforded the collector to arrange for customs facilities.

Should passengers be carried, the owner or pilot of the aircraft shall also make arrangements with the Department of Immigration for proper entry.

### Westinghouse Airport Lighting Booklet

**A** NEW publication has been printed by the Westinghouse Electric & Manufacturing Company on airport lighting. Contained in the publication are the lighting requirements of the U. S. Department of

Commerce, including the candlepower for beacons and all regular airport lights.

## INSPECTION FLIGHT OF P.A.A. LINES

**C**OLONEL and MRS. CHARLES A. Lindbergh took off from Roosevelt Field, Long Island, on September 19, on a 7,000-mile tour of South America to make an inspection of the lines of Pan American Airways in the southern continent. If the radio facilities on the line between Mexico and the Canal Zone are deemed adequate, Col. Lindbergh, as technical advisor of the company, will recommend a date for the inauguration of passenger service over the route.

The purpose of the flight is to make final tests and inspection of the new two-way system of radio communication installed between planes in flight and eighteen ground stations now established over the routes of the Pan American Airways.

Colonel and Mrs. Lindbergh, accompanied by officials of the Pan American lines will take the regular mail plane as far as San Juan, Porto Rico, where they will transfer to a Sikorsky Wasp-powered amphibion for the flight over the Virgin Islands to Paramaribo. From there they will fly along the north coastline of South America, stopping in Venezuela. There Colonel Lindbergh will confer with the President, Dr. Juan Bautista Perez, with reference to establishing airlines through that country to form a shuttle link between the two lines on either side of the southern continent.

Leaving Maracay, Venezuela, the party will continue northward to Cristobal, Canal Zone, the main transfer point on the operating line along the west coast. From Cristobal back to Miami, via Havana, the route will be inspected for the proposed passenger service.

The arrival of the air mail carried in the plane of the party in Paramaribo on Sept. 24, will mark the completion of the first air line to the east coast of South America.

## BRAZIL AS AN AERONAUTIC MARKET

**B**RAZIL figured in the export trade during July to the extent of \$3,200. J. W. Davis, Jr., Assistant Trade Commissioner for Aeronautics, who recently returned from Rio de Janeiro, states that that country is probably one of the best potential markets for aircraft and aeronautic products. "Brazil," he said, "is one third larger than the United States and has but one third as much railway mileage."

"There is a wealthy class requiring a means of fast transportation and educated to the advantages of air travel. There are but few highways in Brazil. The resources such as the coffee plantations and the mines are located in the interior, which is inaccessible, in most cases, except by mule-back or canoe. There is a plateau extending 3,000 feet above sea level several hundred miles back from the coast at the central and southern part of the country which presents good opportunities for the installation of airports. The way to enter the Brazilian market is to demonstrate equipment and carry on negotiations in a tactful manner. Some American representatives have gone to Brazil, and, even before arrival, have antagonized government officials and business men by means of exaggerated publicity. The Brazilians are friendly toward Americans and, if treated with courtesy, remain loyal to the firms and organizations with which they first deal. A superior attitude in dealing with Brazilians will never pay in the large potential market of Brazil."

## AIRCRAFT PRODUCTS CORPORATION

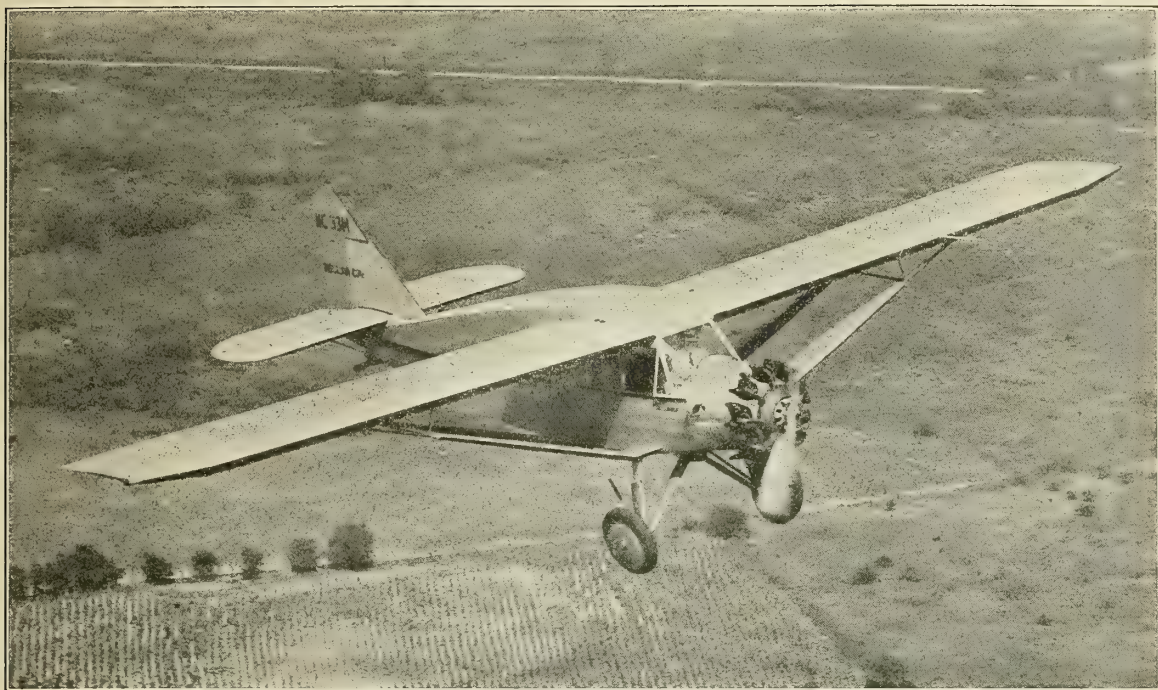
**O**RGANIZED early in 1928, the Aircraft Products Corporation of America, in Detroit, now occupies a manufacturing space of 5,000 square feet with 30 men working day and night shifts to fill its orders. Its products have been used by 42 aircraft manufacturers, and are standard equipment on 22 planes.

Ralph R. Irwin, president of the Aircraft Products Corporation, and Robert S. Gans, vice president, had worked together in the automotive industry since 1911 as sales executive and manufacturing executive, respectively. Early in 1928 the two decided that their experience would combine excellently in the manufacture of airplane parts. They found that many aircraft manufacturers were building their own shock absorbing units, and that these units were all similar in detail and operation. They decided to standardize these units and manufacture them for planes of various weights.

From designs and specifications sent to them by the producers of airplanes, the officers of the Aircraft Products Corporation

(Continued on next page)





The new 1930 Bellanca Pacemaker. Payload (with pilot), 1,235 lbs. High speed, 145 m.p.h. Cruising speed, 122 m.p.h. Brochure with specification on request.

# A Clean-up at Cleveland

NO commercial plane has ever made such a complete demonstration of superiority as the Bellanca at the Cleveland National Air Races. Out of 7 events entered, the Bellanca stock models took 5 First Prizes, 2 Second, 3 Third, and 2 Fourth. It is a remarkable tribute to Bellanca that, where measured on combined speed, carrying capacity and take-off, almost the same design has won so repeatedly—originally and essentially a Bellanca design.

For the fifth time a Bellanca six-place cabin monoplane captured the Aviation Town and Country Club Trophy; for the third time, the Detroit News Trophy for Speed and Efficiency. In the latter contest, planes were required to take off with full Department of Commerce loaded weight within 900 ft., which both Bellancas did easily, though three other cabin planes, some of equal, some of greater h.p., and some carrying less load than the Bellanca, failed at Cleveland to take off in this distance.

Here are the official awards:

## Philadelphia-Cleveland Derby

(Heavy class)

First Place	J. Wesley Smith	Bellanca 300 h.p.
(Light class)		
Third Place	Howard P. Young	Bellanca 220 h.p.

## Cleveland-Buffalo Efficiency Contest

First Place	George W. Haldeman	Bellanca 300 h.p.
Second Place	J. Wesley Smith	Bellanca 300 h.p.
Fourth Place	Howard P. Young	Bellanca 220 h.p.

## Detroit News Trophy for Speed and Efficiency

(Third time won by a Bellanca stock model)

### For Speed:

First Place	George W. Haldeman	Bellanca 300 h.p.
Second Place	J. Wesley Smith	Bellanca 220 h.p.

### For Efficiency:

First Place	George W. Haldeman	Bellanca 300 h.p.
Third Place	J. Wesley Smith	Bellanca 220 h.p.

## Event No. 19—Cabin Plane Speed Race

(Competing against 425 h.p. speed planes with N. A. C. A. cowling)

Third Place	J. Wesley Smith	Bellanca 300 h.p.
Fourth Place	Howard P. Young	Bellanca 300 h.p.

## Aviation Town and Country Club Trophy

(Fifth time won by a Bellanca)

### For Efficiency:

First Place	J. Wesley Smith	Bellanca 220 h.p.
-------------	-----------------	-------------------

The sales actually closed at Cleveland were the best possible confirmation of these triumphant results. For Bellanca, Cleveland definitely spelled a new step of progress that will be shared by every Bellanca sales representative. Bellanca Aircraft Corporation, New Castle, Delaware.

# BELLANCA



(Continued from preceding page)

developed the Oildraulic shock absorber. The absorbers are made for landing gear and tail wheels and may be fitted to planes weighing up to 7,000 pounds. The absorbing principle employs oil to take the first shock of landing. A rebound chamber precludes bouncing in any rough landing. When the plane has settled, and its weight is on the wheels, a coiled spring in the unit carries the weight and absorbs the shocks of taxiing.

Early orders were filled by the assembly method; parts were manufactured by individual contractors and a small machine shop was rented for the assembly. In November, 1928, the firm moved into a downtown building in Detroit where there was more floor space. At present the machinery and employees work 20 hours a day. Additional space has been rented, and automatic machinery is being installed to increase production. The officers of the firm are now seeking larger quarters that will give adequate facilities.

The acceptance of standardized manufac-

turing accessories by the aeronautical industry is illustrated by the increase in the number of planes on which the Oildraulics are standard parts. At the Detroit Aircraft show a year ago, not a plane displayed was equipped with the company's shock absorbers. At the Chicago show seven months later, 12 planes used Oildraulics as standard equipment. At the Detroit show in April of this year, 30 planes were equipped with the Aircraft Products Corporation absorbers.

"We were right about standardization," Mr. Irwin said recently. "Day after day we find that manufacturers do not want the trouble of designing and building their own shock-absorbers. They send us blue prints gladly, and standardize on a product that is ready made."

A wheel and brake unit is also being developed by the company. It will be ready for distribution this summer, according to Mr. Irwin.

The officers of the company are Mr. Irwin, president, Mr. Gans, vice president and treasurer, A. J. Leven, secretary, and J. H. Mozni, chief engineer.

## AIRCRAFT PRODUCTION, FIRST HALF 1929

RECENT aircraft production reports show that approximately 3,500 commercial and military airplanes of all types were constructed in the United States during the first six months of 1929. This information was made public at the National Air Races by the Aeronautical Chamber of Commerce of America. The estimated retail value, less motors, of the six months' production is \$25,000,000.

Reports from seventy-one manufacturers show an actual total of 3,381 airplanes produced during this period. Of this number 2,854 were designed for commercial use, representing a total value, less motors, of \$17,032,747, and 527 military airplanes were produced representing a total value, less motors, of \$6,652,825, giving a total valuation of all airplanes definitely accounted for of \$23,685,472. Figures for this period show that commercial manufacturers have so far this year produced 80 per cent of last year's total, and that military manufacturers have produced 43 per cent of last year's total of 1,219 military aircraft.

Fifteen airplane engine manufacturers report a total of 3,826 engines produced, representing a total value of \$14,349,375.45. Of this number, 3,275 were absorbed by the commercial market representing a total value of \$10,923,374.30. These figures show a 78 per cent increase for the first six months period over the entire output of last year with an increase in value of 20 per cent. Five hundred and fifty-one military engines were produced by three manufacturers. These motors were valued at \$3,426,001.15. The figures show a decline in the production of military engines, as the total for this period shows but 40 per cent of the total of last year, when 1,431 military engines were produced.

Of all types manufactured during the six months' period of 1929 open cockpit biplanes lead with a total of 1,623—cabin monoplanes ranking second with 884. Although there

were 500 more biplanes manufactured, monoplanes show a value of approximately \$4,500,000 greater. Multi-motored transports show the largest increase for a type. Adding spare parts for both engines and airplanes of all types, the total retail valuation of aeronautical products produced in this country is estimated at \$50,000,000 for the first six months of 1929 as contrasted with \$62,000,000 for all of 1928.

### Production of Commercial Aircraft.

	MONOPLANES	BIPLANES
Open cockpit .....	144	1,623
Closed cockpit .....	884	17
Multi-engined transp..	115	....
Total .....	1,143	1,640
Total retail value (less motors) ....	\$9,829,845	\$5,421,902

### MISCELLANEOUS

Flying boats and seaplanes .....	18
Amphibions .....	53
Total .....	71
Total retail value (less motors) ..	\$1,781,000

### Production of Aircraft Engines

	Number	Value
Under 50 horsepower..	43	\$33,540.00
50-100 horsepower....	509	482,500.00
100-150 horsepower....	713	1,493,750.00
150-200 horsepower ..	288	648,000.00
200-300 horsepower ...	480	1,391,800.00
300 horsepower and up.	1,242	6,883,784.30
Total .....	3,275	\$10,923,374.30

### Comparative Aircraft Production

	BIPLANES				
	Open	Cabin	Multi-	Total	Value
			motored		(less motors)
All of					
1928 ..	2,348	69	5	2,422	\$7,541,615
Six months					
of 1929	1,623	17	..	1,640	5,421,902

	MONOPLANES				
	Open	Cabin	Multi-	Total	Value
			motored		(less motors)
All of					
1928 ..	171	850	58	1,079	\$8,738,683
Six months					
of 1929	144	884	115	1,143	9,829,845

### SEAPLANES, FLYING BOATS AND AMPHIBIONS

	Sea-	Amphi-	Total	Value
	planes	bions		(less motors)
All of 1928..	11	30	41	\$914,000
Six months				
of 1929...	18	53	71	1,781,000

### COMPARATIVE TOTALS

	Total of all Types	Total Value (less motors)
All of 1928.....	3,542	\$17,194,298
Six months of 1929..	2,854	17,032,747

### Comparative Commercial Aircraft Engine Production

	All of 1928	Six Months of 1929
Up to 50 horsepower.	32	43
50-100 horsepower....	237	509
100-200 horsepower...	182	1,001
200-300 horsepower...	924	480
300 horsepower and up	475	1,242

Total .....	1,850	3,275
Total retail value ..	\$8,936,725	\$10,923,374.30

## AERONAUTICAL CHAMBER OF COMMERCE SECTION MEETINGS

DISCUSSIONS promoting the interests of the aeronautical industry as a whole, and proposals for the elimination of present evils in aviation were advanced in the meetings of the various groups of the Aeronautical Chamber of Commerce of America during the National Air Races and Exposition held in Cleveland, August 24 to September 2. Topics discussed at the meetings of the organization included the present airworthiness requirements of the Department of Commerce for the licensing of aircraft, the development of interest in air travel, the specifications and identification of aircraft fuels, sales organizations, servicing problems, and the problem of questionable and inadequately equipped flying schools.

### AIRWORTHINESS REQUIREMENTS DISCUSSED

Commercial airplane manufacturers, meeting in one of the aeronautical industrial conferences arranged by the Aeronautical Chamber of Commerce of America, expressed general satisfaction with the present Airworthiness Requirements set up by the government to protect the American public. The Airworthiness-Requirements, which is the engineering code followed by commercial airplane manufacturers to obtain government approval of their planes, was discussed and only minor modifications recommended.

Possible changes in the present spinning tests, and maximum engine speed requirements were considered and a committee of three manufacturers appointed to present these as well as other technical aeronautical problems to officials of the Department of

(Continued on next page)

# AERO FIRE EXTINGUISHER

PISTOL TYPE



*Just  
pull the  
trigger!*

**A Fire Extinguisher  
Designed by  
Government Engineers  
For Aircraft**

The Aero Pistol Type Fire Extinguisher is light in weight and simple in construction. The few working parts are out of the fluid and cannot jam, stick or corrode. Metals are used that resist corrosion. The mechanism is not affected by constant exposure to varied climatic conditions. All exterior parts are cadmium plated.

The Aero Pistol Type Fire Extinguisher looks and operates like a pistol. Point it at the base of the fire and pull the trigger. This discharges a powerful stream of chemical that gasifies and ex-

pands 3,600 times in contact with heat. This action excludes oxygen and smothers fire. Releasing the trigger stops the stream. The extinguisher can be held steadily and the stream properly directed without loss of fluid.

Aero Fluid contains no alkali or acids. It will not harm metals or finishes. Neither will it stain nor injure fabrics. Aero Fluid will not deteriorate or freeze. It is a non-conductor of electricity.

A dependable extinguisher for general use, in the Cockpit, the Cabin or the Hangar.

A Product of

**AIRCRAFT SAFETY DEVICES**  
INCORPORATED

CLEVELAND, OHIO.  
U.S.A.



(Continued from preceding page)

Commerce. A code of procedure, governing the relations of aircraft manufacturers in the Aeronautical Chamber of Commerce with the Department of Commerce in the development of the Airworthiness Requirements, was approved by the manufacturers' section.

The code provides for the publication of Airworthiness Requirements once each year, on January 1, and for a joint meeting of manufacturers with officials of the Department of Commerce to consider proposed changes in the requirements each September.

William P. MacCracken, Jr., praised the spirit of close cooperation that exists between manufacturers of aircraft and the government in regulation and licensing of manufacturers with officials of the American public. The manufacturers and government officials agreed that changes in the requirements should be made according to a definite code of procedure, which should not work a hardship on the constructor or unnecessarily burden the Department of Commerce.

It was proposed that changes in the Airworthiness Requirements be issued in loose leaf form and that additions to the requirements be issued at any time during the year. Changes or additions would be made optional for a period of several months from the date of issue. Optional changes or additions would apply only on new designs received by the Department of Commerce later than four months after the date of issue of a change. The joint meeting also considered methods of obtaining cooperative action on drafting changes or additions to the Airworthiness Requirements.

#### AIR TRAVEL TO BE ENCOURAGED

The Accessory and Material Section instructed its executive committee to formulate an extensive program for the development of interest in air travel, and pledged its support to the projected program. Declaring that the development of aviation, and finally private flying, depends upon the creation of greater interest in the use of air travel over the regularly established lines, the section went on record as ready to back an extensive "Travel by Air" campaign as soon as the details can be worked out.

The section elected James R. Fitzpatrick, vice-president of the Haskelite Manufacturing Company, as its permanent chairman and authorized the appointment of the following executive committee: C. H. Colvin, H. G. Boynton, S. L. Gabill, T. B. Cothy, Detroit, George Stich, and Arthur Raabe.

#### IDENTIFICATION OF FUELS URGED

The airplane fuel standards committee of the Aeronautical Chamber of Commerce Fuel and Lubricants Section discussed methods by which the oil companies may better meet the demands of newly designed aircraft engines, which have undergone rapid development. The committee considered a proposal to set up an agency within the Aeronautical Chamber of Commerce through which the technical specifications of aeronautical gasolines and oils, and the practical demands of aircraft engine operation, may be co-ordinated and certain fuels be identified

as approved for specific engine types.

Adoption of the proposal would simplify the purchase of gas and oil by itinerant fliers or air transport operators who fly from one section of the country to another, where different oil companies are distributing their products. It would provide a standard by which the pilot would be able to buy his gas and oil throughout the country with certainty.

Major E. E. Aldrin was elected chairman of the section to succeed Frank Shipman. The members of the executive committee selected and the sections of the country each represents follows: Capt. Frank S. Hawks, northeastern division; A. M. Maxwell, east-central; L. M. Larson, southeast; J. P. Porter, north-central; George Fredell, south-central; S. S. Chadderton, northwest; and Dudley Steele, southwest.

#### DEALERS DISCUSS SALES AND INSURANCE

The Distributor-Dealer section of the Aeronautical Chamber of Commerce of America discussed plans for a national marketing program to keep abreast of production schedules. Airplane engine production reports, made public at the Aeronautical Chamber of Commerce meeting of aircraft engine manufacturers, showed that 3,826 motors were manufactured during the first six months of this year. It showed an active market for the medium priced motor for commercial use with a total value of \$14,349,375.45 placed upon engines alone produced during the first six months of this year. Fifty million dollars was set as a conservative estimate of the retail value of airplanes, engines, and parts produced in the United States during the first six months of the year. Approximately 3,500 planes were produced with a value of \$25,000,000, without motors. The engine valuations and the production of airplane parts brought the total up to \$50,000,000.

The distributors and dealers of aircraft urged a better understanding of the aviation insurance problem among the companies in the field.

George Weis of New York was appointed chairman of the executive committee of the newly formed national distributor-dealer section. Other members of the executive committee and the sections of the country they will represent are: Bob Hewitt, southeast division; Louis Meister, east-central division; Maj. Paul Kemp, north-central division; Randolph Page, south-central division; Nick Mamer, northwest division; and H. C. Lippiatt, south-west division.

#### SERVICE CONDITIONS TO BE STUDIED

The manufacturers of commercial airplanes and engines attending the industrial conferences of the Aeronautical Chamber of Commerce of America agreed to make an exhaustive study of service conditions and uniform discounts in the automotive industry as a key to the development of better service for the airplane owner. Efficient engine service, the aeronautical experts agreed, demands expensive shop equipment, substantial inventory cost and special training of personnel to give the utmost in service to the general public. Adequate engine service was considered as much of a specialty

as engine manufacturing itself, and it was therefore considered best to place the major responsibility for aircraft engine service upon the manufacturers of engines rather than the plane producer.

The Commercial Airplane Manufacturers section elected J. Don Alexander chairman of its executive committee, and the following representatives were appointed for general sections of the country: C. N. Montieth, northwest; A. H. Loughheed, southwest; J. Don Alexander, south-central; T. F. Hamilton, north-central; C. J. Brukner, east-central; R. B. C. Noordyn, north-east; R. H. Depew, south-east.

#### ACTION AGAINST INADEQUATE SCHOOLS

The national flying school committee of the Aeronautical Chamber of Commerce of America took drastic action to rid the country of inadequate flying schools, which are considered the most dangerous drawback to aviation. The committee adopted a resolution authorizing the Aeronautical Chamber of Commerce to investigate all cases of questionable flying schools reported to it by the general public, or by organizations in the aircraft industry, and to give wide publicity to its reports.

Through the questionable advertising committee of the Aeronautical Chamber of Commerce, newspapers and magazines will receive copies of all reports prepared by the Chamber with a request that the advertising of the reported school be withheld from publication. The activities of schools which use questionable methods to obtain youthful students for their institutions and do not have adequate equipment to give proper flying instruction are to be reported to the Chamber and investigated by it.

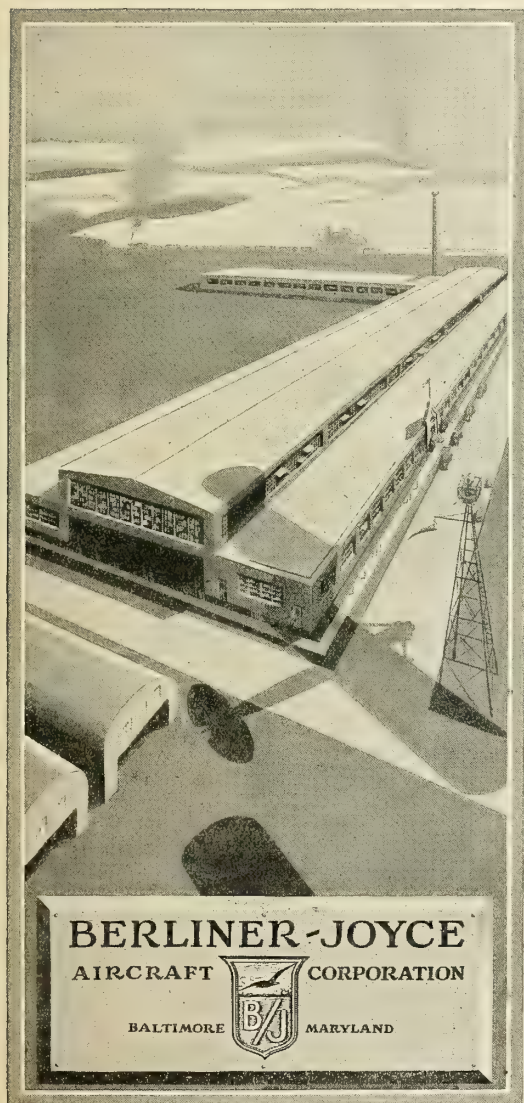
C. S. (Casey) Jones, president of Curtiss Flying Service, was elected chairman of the national flying school committee recently appointed to investigate the flying school problem. Other members of the committee are: Oliver Parks, Chan C. Mason, W. D. Haviland, John Bowers, W. Jack Frye, Tex Rankin, H. F. Lusk and Cloyd Clevenger.

While the flying school committee was in session, the finance and insurance section of the Aeronautical Chamber of Commerce undertook a study of the time-payment financing of airplanes.

O. N. Doyle recommended that students graduating from flying schools should not be financed on the possibilities of their earning capacity during their first few months of commercial flying. Maj. Reid Chambers recommended a more extensive exchange of personal and credit data between the insurance and finance companies on all pilots seeking insurance or time-payment financing of their planes. Maj. M. R. Lloyd discussed the reasons that aviation insurance is so high at the present time, and expressed a conviction that rates would drop as soon as more definite and complete data on the risks incurred could be collected.

The Finance-Insurance section considered proposed changes in the machinery for recording liens on planes sold on the time-payment plan when Edward Howard, chief of the regulations division of the Department of Commerce, explained the inadequacy of the recently adopted system.

# The B/J Franchise is Valuable



**Man Power** is the secret of salespower for the B/J distributor and dealer. Back of the B/J plane is the weight of a great staff of foremost aircraft engineers. They were gathered together for the pioneering of new designs for military planes. This same original designing is carried into the B/J commercial planes, truly destined to be pacemakers of the air. Every B/J distributor and dealer knows that back of the plane he sells is an engineering staff that is making history for the planes they build, and permanent profits for the dealer. Some distributor territories are open. . . . Write for information.

**A**N ENCLOSED PLANE without a blind spot! The illustration at the right shows the modified high wing construction of the new B/J two place monoplane which affords the pilot full vision both above and below the wing. Built in a new, quarter-million dollar plant at Baltimore, with every facility for high-quality, low-cost production, the new B/J will set new standards in salability as well as in ease of handling and safe, comfortable, carefree flying. For information write to G. Roger Coats, Sales Manager, Berliner-Joyce Aircraft Corp., Baltimore, Md.





# A NEW AERONAUTICAL ENTERPRISE

## *The Saunders Fly-It-Yourself System*

**T**HE first drive-it-yourself company in automotive history has also more recently become the first fly-it-yourself organization in aviation annals. Although the idea of renting airplanes to licensed pilots under this plan is yet too new to permit accurate predictions regarding its success, the officials of the Saunders Fly-It-Yourself System have inaugurated this undertaking on an extensive scale, apparently because they are convinced of the future of flying both as a sport and a utility. Because this same group of men in 1915 had as much confidence in the future popular use of automobiles, they have built up a nationwide system for renting motor cars, and are now operating in fifty-four cities in the United States. The Saunders Fly-It-Yourself System is now being established in an equal number of municipalities, insofar as suitable fields are available and arrangements can be worked out. Unlike the renting of automobiles which the Saunders company began in Omaha with one 1913 model Ford, the plan for renting out airplanes is being initiated with a fleet of one hundred Arrow Sport biplanes, powered with Kinner engines. Delivery is being made at the rate of five ships per week.

The idea of renting airplanes on a mileage basis may aptly be termed "retailing airplane transportation." The man who sells a motor car to an individual actually is wholesaling motor car transportation, for he sells fifty or sixty thousand miles of transportation all at one time. The same is true

when a dealer sells an airplane. He sells thousands of miles of airplane transportation.

The fly-it-yourself system is, in actuality, the retailing of airplane transportation. The customer buys just exactly the number of miles he has use for at that moment and does not have on his hands the expensive investment of an idle airplane.

The basis of charges for rental of these planes is to be approximately one-half more than the charges for the drive-it-yourself motor cars. In other words, if one rents a motor car to drive from A. to B., and the cost is \$10, the cost for a plane to fly from A. to B. will be about \$15. These planes are being equipped with meters to register the actual mileage. There will be one charge for flying time and a small charge for the time a plane is out, but not in actual use.

There is a unique feature in the establishment by the Saunders Drive-It-Yourself System of a fly-it-yourself service. In 1923, when the company was incorporated, the articles of incorporation specified that the company was organized for the purpose of selling drive-it-yourself transportation "on land, on water or in the air." At that time the company did not at all contemplate renting airplanes but simply was showing good foresight by including in its charter the right to sell transportation in all the forms known to man.

The new Saunders service, which was officially inaugurated on September 15th, has

established its main office and headquarters at Fairfax Airport, Kansas City. The company's facilities at Fairfax include a handsome steel and concrete hangar, which measures 100 by 100 feet, and an office annex, 40 by 40 feet, both of which are leased from Fairfax Airports, Inc., operators of that field and of Rosecrans Field at St. Joseph, as well as four auxiliary airports in Missouri and Kansas.

The Saunders Fly-It-Yourself System made a study for many months of the various small airplanes that might be suitable for the purpose. Naturally, the officials of the company gave some thought to operation costs and to initial costs. However, they assert that they were interested chiefly in the flying safety of the equipment they chose. The very nature of the business, renting planes for general use, necessitates particular attention to the element of safety in operation.

The Saunders company includes a father, Warwick Saunders, and his four sons, Harris Saunders, Joe Saunders, Warwick Saunders, Jr., and Ellis Saunders.

The cities in which the fly-it-yourself service is being established are the following:

Akron, Ohio	Kansas City, Mo.
Atlanta, Ga.	Knoxville, Tenn.
Augusta, Ga.	Louisville, Ky.
Baltimore, Md.	Memphis, Tenn.
Bessemer, Ala.	Milwaukee, Wis.
Birmingham, Ala.	Mobile, Ala.
Cedar Rapids, Ia.	Montgomery, Ala.
Chattanooga, Tenn.	Nashville, Tenn.
Chicago, Ill.	Newark, N. J.
Cincinnati, Ohio.	Omaha, Nebr.
Cleveland, Ohio.	Oklahoma City, Okla.
Council Bluffs, Ia.	Peoria, Ill.
Dallas, Texas.	Philadelphia, Pa.
Davenport, Ia.	Richmond, Va.
Dayton, Ohio	Rockford, Ill.
Colorado Springs, Colo.	Rock Island, Ill.
Columbus, Ga.	Sioux City, Ia.
Columbus, Ohio.	Springfield, Ohio.
Decatur, Ill.	St. Joseph, Mo.
Denver, Colo.	St. Louis, Mo.
Des Moines, Ia.	Toledo, Ohio.
Detroit, Mich.	Topeka, Kans.
Ensley, Ala.	Tulsa, Okla.
Evansville, Ind.	Tuscaloosa, Ala.
Galesburg, Ill.	Washington, D. C.
Houston, Tex.	Waterloo, Ia.
Indianapolis, Ind.	Wichita, Kans.

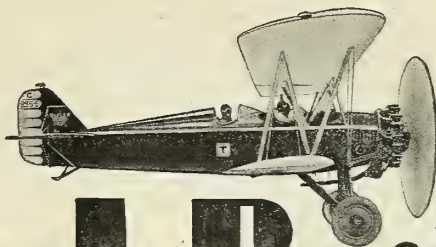
## NEW EDITION OF MOBIL OIL AERO CHART

A NEW edition of the Gargoyle Mobil Oil Aero Chart has been issued by the Vacuum Oil Company. The chart lists the summer grades of Mobil Oil for approved engines.

The new Mobil Oil aero oils—Mobil Oil Aero H and Mobil Oil Aero B—are incorporated in the chart for the first time. Among the engine makes and models for which Mobil Oil Aero H is recommended are the Comet, Curtiss Chieftain H-1640, Kinner K-5, Pratt and Whitney Hornet, Pratt and Whitney Wasp, Warner Scarab and eight Wright models. Mobil Oil Aero D is recommended for six Curtiss models.



Upper: Arrow Sport biplane used in the Saunders Fly-It-Yourself System; lower: the Saunders hangar at Fairfax Airport (members of the Saunders family are at the left)



# Steel Buildings



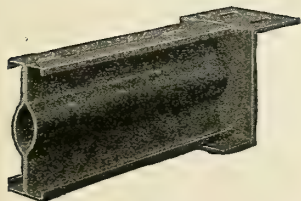
## Shelter This Aircraft Factory

**F**OR months booking of orders for the Butler Blackhawk airplane by the Butler Aircraft Corporation exceeded production. New and larger quarters became more painfully necessary day by day.

July 1st, 1929, contracts were let for the building of twin factory units to cover a floor space area of 35,000 sq. ft. at the Kansas City Airport. Specifications called for Butler Ready-Made Steel Buildings insulated with gypsum board to shelter manufacturing operations.

**SIX WEEKS LATER** the Butler Blackhawk was in increased production in its new home. Office and engineering personnel were forced to wait longer for their masonry quarters which afford no greater comfort.

In addition to speedy erection, Butler Ready-Made Steel Buildings offer completeness, economy in acquiring and in maintenance, fire-safeness and structural qualities which make for permanence yet which permit enlarging.



A new booklet picturing various installations of Butler Buildings awaits your request. The Butler engineering staff will submit all the detailed information needed to make a selection to fulfill your particular requirements.

**BUTLER MANUFACTURING CO.**  
1234 Eastern Ave. Kansas City, Mo.  
934 Sixth Ave., S. E. Minneapolis, Minn.



# BUTLER

READY-MADE  
STEEL BUILDINGS





## NEW YORK

**WOMEN'S** classes in flying instruction were opened by Curtiss Flying Service at New York University on September 16. Roland H. Spaulding, director of Curtiss ground schools, is in charge of the course.

The course includes theory of flight, history of aviation, air commerce regulations, construction of planes, air navigation and meteorology. One of the interesting and graphic aids to instruction which will be used is a recently designed mechanism by the use of which students may fly a miniature airplane by operating the controls in a full-sized cockpit in front of a small wind tunnel.

**PITCAIRN AVIATION, INC.**, was recently awarded dealerships for planes sold by the Curtiss Flying Service in cities served by Pitcairn Airlines. These dealerships will be established at Richmond, Greensboro, Spartanburg and Atlanta.

**NEW YORK UNIVERSITY**, with the cooperation of the Daniel Guggenheim Fund Committee on Elementary and Secondary Aeronautical Education, will start a special intensive course for eight weeks in the training of teachers for aviation ground schools on October 14. The new course will continue the program for the training of teachers as organized last summer. The course will last eight weeks instead of extending it over a whole semester, in order to make it possible for flying schools to permit some of their personnel to attend. The classes will meet five times per week.

The courses are designed to enable the student to pass the Department of Commerce examination for a ground school teacher's license, and will give practical preparation for the teaching of the subjects now required by the Department of Commerce for the curriculum of ground schools. The courses offered by the school include instruction on problems of aeronautics in schools, airplanes, instruments, communication, regulations, supervision, engines, meteorology and navigation.

**PRATT INSTITUTE** in Brooklyn, N. Y. started an evening course in technical airplane design and stress analysis on September 26. The course will continue 24 weeks, and is in addition to the aeronautic course in industrial mechanical engineering offered by the Institute in its day courses.

**THE** Aviation Corporation recently acquired two air transport companies in Alaska, the Wien Alaska Airways and the Bennett Rodebaugh Airplane Company. A new holding company to be known as Alaska Airways, Inc., has been formed which controls the two air transport companies.

Lieutenant Ben Eielson is to be executive vice-president and general manager of the new enterprise. He has been making his headquarters at Nome and will at once start the development of general flying activities at Nome, Fairbanks and other centers in the Alaskan territory.

**THE** Consolidated Instrument Company of America recently announced a new improved type pitot-static tube for monoplane wing mounting. Two features of the new pitot tube are greater rigidity and stronger construction. They are being manufactured by Aircraft Control Corporation in Philadelphia, a division of the Consolidated Instrument Company.

**GEORGE F. HARTWIG, Jr.**, of New York, has been appointed field service engineer for the Consolidated Instrument Company of America, Inc. Mr. Hartwig will be in charge of field service for the company.

**MAJOR C. E. FAUNTLEROY** has been elected president of the Federal Aviation Corporation of New York City which owns the Washington Air Terminals, Inc., and the Russell Parachute Company.

**EARL L. HOUSE AND COMPANY, Inc.**, recently announced that it has sold its distribution franchise for Moth planes in the territory including Metropolitan and Southern New York and the northern half of New Jersey to the Curtiss Flying Service Inc. Earl L. House stated that the opening of a general finance department by his firm precluded plans for general exploitation of the Moth in the territory. The interests of the House organization will be divided between aviation and financing issues outside the industry.

**DONALD WOODWARD**, president of the D. W. Flying Service, Inc., at Le Roy, N. Y., recently offered two twenty-hour flying courses to members of Troop A of the New York constabulary at Batavia, N. Y.

**FRANCIS H. LOVE** was recently elected president of United Aircraft Exports, Inc., a division of the United Aircraft & Transport Corporation. The United Aircraft Exports was incorporated to take care of the foreign demand for military and commercial planes manufactured by the United components of the United Group—Boeing, Vought, Sikorsky, and Stearman as well as Hornet and Wasp engines made by the Pratt & Whitney Aircraft Co., and Hamilton Metal propellers.

**I**n an effort to determine the anti-knock relations of various blends of fuel on both automobile and airplane engines, special tests have been started at the Detroit Engineering Laboratory of the Ethyl Gasoline Corporation and at Wright Field, Dayton, Ohio. The army engineers and the Ethyl Gasoline Corporation will work in conjunction and will check each other on a number of blends of fuel. As a mechanical check at both places special knock testing machines which have recently been developed will be in operation.

**BARBER & BALDWIN, INC.**, of New York, has been named as underwriting agents for complete aviation insurance facilities offered by the Fire Association fleet,

according to a recent announcement. The fleet is composed of the Fire Association of Philadelphia, the Reliance Insurance Co., the Victory Insurance Co. and the Constitution Indemnity Co.

**THE** Northern Aero Corporation, which is dealer for Travel Air planes and for the Allmetal Flamingo, has offices in New York City, and is using space of the N. R. Airways, Inc., at Curtiss Field. The firm also handles airport equipment. The officers of the organization include P. L. Salussolia, president; A. Dawydoff, vice president; and R. K. Vogelbach, secretary.

**N. S. MEYER, INC.**, of New York City, manufacturers of emblems, badges, and insignia for the aeronautical industry, has organized and equipped a new department for the creation of new designs. Flying clubs, firms, schools, and individuals are using the products of the company for identification, according to officials of the concern.

**THE** American Aeronautical Corporation with a factory on Manhasset Isle, Long Island, was acquired recently by Allied Motor Industries, Inc. The American Aeronautical Corporation holds rights of manufacture and sale, for all North America and Cuba, of the Savoia-Marchetti seaplanes and amphibians, product of the Societa Idrovolanti Alta Italia.

## CENTRAL NEW YORK

[MILDRED MARVIN]

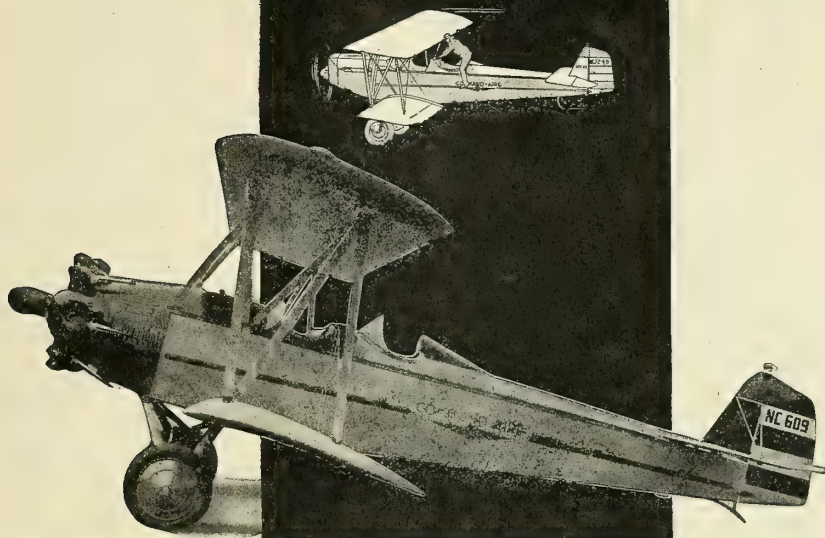
**L**IGHTS on the Albany-Buffalo division of the Albany-Cleveland Airway will be turned on November 1, according to recent announcement of airways officials. This will result in a change in the air mail schedule through Syracuse operated by the Colonial Western Airways. It is expected that the westbound plane will leave Albany for Syracuse and Buffalo about 8 P. M., inaugurating night service through Syracuse. When the lights along the route are in use, the mail planes will fly both ways at night, thus making better connections with the trans-continental lines in Cleveland and with the New York City lines in Albany. The work of installing the beacon lights is completed. The lights are located approximately 10 miles apart between Albany and Cleveland with lighted emergency fields every 50 miles.

**E**STABLISHMENT of a mechanical school in connection with the flying school of General Aviation Company at Syracuse was announced recently by Fred T. McGlynn, chief pilot and operations manager of the company. Al Just has been named as head of General Aviation's new mechanical school.

**THE** Rochester Airport Flying Club is being incorporated, and has purchased a Waco for instruction work. Capt. Bill Skall has been elected president, and Edward Partis, secretary and treasurer. The membership includes, besides the officers, Alvah

(Continued on next page)

# STABILITY

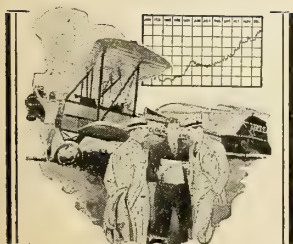


Command-Aire 5-C-3 Powered with Curtiss-Challenger 170 H. P. Motor. See specifications below.

## Stability always controls your COMMAND-AIRE

"UNCANNY," "epochal," "revolutionary," "incredible"... these are some of the terms which experts in aerodynamics have used in acclaiming the STABILITY of Command-Aire. Recently a pilot flew his Curtiss-Challenger powered Command-Aire from San Diego to Los Angeles in one hour and thirty-eight minutes, *without once touching the stick.* (Name and date on request.) Command-Aire test pilots demonstrate the uniformity of Command-Aire STABILITY by leaving the cockpit and straddling the fuselage in factory test flights, while their planes continue safely under perfect self-control. This is not in any sense a stunt, but only matter-of-fact routine performance by Command-Aire. ¶ Your Command-Aire takes off quicker on a steeper path. It flies under positive control at stall speed. *You know your plane will come out of any spin...* that you may land slowly in minimum space. Command-Aire is as safe and stable in flight as a boat running upon the water's surface... for as the boat floats upright because of correct engineering, so does your Command-Aire float upon the air. ¶ Slotted joining of ailerons to the lower wings is a vital factor in Command-Aire's unrivaled STABILITY—yet slotted ailerons are only one of Ten Cardinal Superiorities built in each Command-Aire. Our space is too short to tell you of the other nine, but our booklet will... and it's yours for the asking, along with a convincing demonstration flight. WRITE NOW, for both.

COMMAND-AIRE, Inc., Little Rock, Ark.



## COMMAND-AIRE

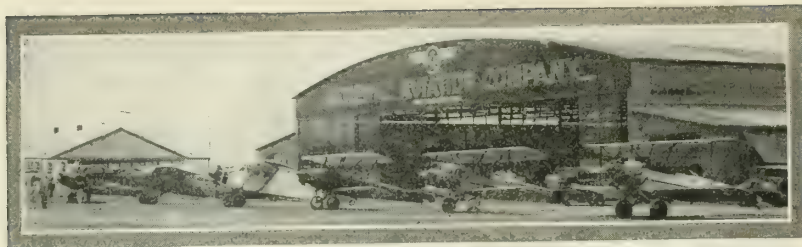


### SPECIFICATIONS

Span Upper Wing.....	31 ft. 6 in.
Span Lower Wing.....	31 ft. 6 in.
Wing Area.....	303 sq. ft.
Height.....	8 ft. 4 in.
Length Overall.....	22 ft. 5 in.
Chord.....	5 ft.
Gap.....	5 ft.
Stagger.....	9 in.
Dihedral Upper Wing.....	None
Dihedral Lower Wing.....	2 Degrees
Gross Weight.....	2363 lbs.
Weight Empty.....	1448 lbs.
Useful Load.....	915 lbs.
Capacity.....	Pilot and Two Pass.
High Speed at Sea Level.....	130 M.P.H.
Landing Speed.....	35 Miles
Cruising Range.....	520 Miles

General Distributors: CURTISS FLYING SERVICE, INC., 27 West 57th Street, New York City





New hangar of the General Aviation Company, Inc., at Syracuse Airport

(New York News continued)

French, James Tulloch, Wesley Klassner, Percy Partis, Bud Trotter, Joseph Schwenzer, and Howard O'Loughlin.

THE General Aviation Company of Syracuse, N. Y., has completed a new hangar at the Syracuse Airport. This hangar is of the latest type of hangar construction and is capable of housing between thirty and forty planes. Its facilities include class rooms, locker rooms, lounging rooms and other special accommodations for students of the General Aeronautics College.

## BUFFALO

THE Thomas-Morse Aircraft Corporation, which was recently acquired by the Consolidated Aircraft Corporation of Buffalo, has received orders from the Army Air Corps for the construction of seventy all-metal observation planes. The planes will be built in a new section of the Consolidated plant at Buffalo, which has been enlarged to provide facilities for the manufacturing of these planes on a mass production basis. Delivery of the planes will be completed by June 30, 1930.

THE Navy seaplane XF-2G-1 has been donated to the aeronautical section of the Elm Vocational School of Buffalo for instruction purposes. The plane is given as a permanent loan to the school by the Bureau of Aeronautics of the Navy, through Raymond C. MacCart, inspector of naval aircraft at Buffalo.

THE Consolidated Aircraft Company of Buffalo has acquired the entire stock of the Fleet Aircraft Corporation of Buffalo, the entire stock of the Thomas-Morse Company, of Ithaca, N. Y., stock in the Kinner Airplane and Motor Corporation at Glendale, California, the entire stock of the National Flying Schools, Inc., and owns one hundred acres of land located across the Canadian Border, near Buffalo, suitable for a factory site and flying field for the purpose of establishing a Canadian factory, according to a recent announcement of Major Reuben H. Fleet, president. The Corporation owns a 98-acre airport in daily active use near Buffalo, which includes a 20-acre factory site, and is operating three plants with a total floor area of 105,000 square feet.

THE Simmons Aircraft Division of Steel, Inc., has contracted for exclusive export sales rights of all General Airplane ships, with the exception of the Dominion of Canada. Included in the agreement are

foreign sales rights for the new Mailplane recently announced by the General Airplanes Company.

Silver Fox Airport at Muncie, Ind., has been appointed for the full line of Aristocrat ships.

ANNOUNCEMENT was made recently by the General Airplanes Corporation that a fourth new model of Aristocrat planes, a four-place cabin monoplane, will be placed on the market on October 1st. The new member of the Aristocrat series will be powered with either a Whirlwind 225 or Whirlwind 300 engine, with a high speed of over 150 miles an hour with full load.

The three other recently announced models of the General Airplanes Corporation, already on the market, include the Mail Plane, powered with a 525-horsepower Pratt and Whitney Hornet; the Sport Plane, which is an open cockpit two-place training ship; and the Aristocrat cabin monoplane, powered with a Whirlwind 165.

## PENNSYLVANIA

CONSTRUCTION of a 300-acre airport at Harrisburg, Pa., which will be a landing field on a projected New York-to-Pittsburgh passenger air service, is to begin immediately under a contract let to the Central Construction Company, of Harrisburg. Owned by the Capital Landing Field Company, of Harrisburg, the field will be maintained under the management of the Pittsburgh Aviation Industries Corporation. The latter company recently made known a program for a ten-hour daily air service between New York and Pittsburgh with its new airport at Butler, 45 minutes from downtown Pittsburgh, as western terminus.

With runways 2,000 feet long and 500 feet wide, the Harrisburg field will be equipped with servicing and housing facilities for planes. An administration building and several hangars will fringe the field. Drainage, lighting and general construction plans were approved by the U. S. Department of Commerce before the building contract was let.

HOWARD STERNE of Wilkes-Barre, Pa., has been appointed dealer representative of the Aristocrat monoplane models, manufactured by the General Airplanes Corporation of Buffalo for the entire north-eastern section of Pennsylvania. The appointment was made by Myron S. Hutchinson, director of airplanes sales for Air Associates, Inc., eastern sales representatives for the Aristocrat.

## PHILADELPHIA

[RUSSELL GARD]

R. H. HORTON, aeronautical expert engaged by Mayor Mackey, of Philadelphia, recently submitted a plan to the city administration for the development of air, marine, and rail facilities for transportation on the Hog Island shipyard site, calling for a municipal outlay of \$6,125,000.

According to the Horton plan, the metropolitan airport would be located 2,000 feet from the Delaware River waterfront, and would comprise an area of 620 acres. Clearfield area available for take-off and landing facilities would be 6,400 feet in length with prevailing summer winds. Take-off distance under winter conditions would be about 4,800 feet. The field has the added advantage of accessibility to the city center.

Seaplane facilities would be provided by about 3,300 feet of waterfront, providing an anchorage basin of 500 to 700 feet in width. Facilities for the Pennsylvania National Guard's flying unit have been laid out to meet the needs of that organization. Mr. Horton recommended that the entire tract be leased to a quasi-public corporation to be known as the "Philadelphia Air Terminal."

The program as outlined has been commended by officials of the War Department, Navy Department, Department of Commerce, and has been indorsed by various transportation agencies and both business and civic organizations of Philadelphia.

BY-LAWS, rules and regulations were discussed recently at a meeting of the Executive Committee of the First N. A. A. Flying Club in Philadelphia at the Penn Athletic Club. David W. Guy presided. At the conclusion of the meeting Mr. Guy said that the club's plane, a new Travel Air 165, was ready to fly, and that members would commence flying activities immediately.

AIR races, in which military and commercial planes participated, marked the dedication of Central Airport, Camden, on September 21. Major Clarence M. Young, chief of the Aeronautics Branch, Department of Commerce, and Lieutenant Al Williams, Navy pilot, were among those taking part in the ceremonies.

W. Sanger Green, general manager of Central Airport, was in charge of the scheduled events, which included a model-flying contest under the auspices of the Aero Club of Pennsylvania, four thirty-mile races for Army, National Guard and commercial planes, a free-for-all thirty-mile race, and a speed contest for Navy planes.

### Dornier Super-Wal Tested for Stout D and C Airlines

THE first of the two Dornier Superwals to be assembled at the Philadelphia Navy Yard for the Stout D and C Airlines successfully made test flights recently. Miguel Kryguin, of the Dornier works at Lake Constance, Switzerland, was test pilot for the seaplane, one of the largest in this country. It has accommodations for thirty passengers.

(Continued on next page)

# It's Hard to Beat a Man at His Own Game

BY

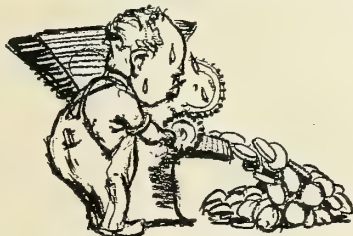
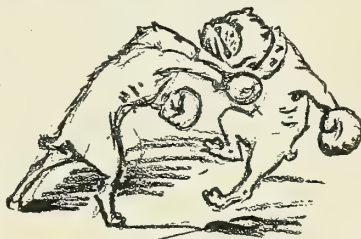
E. B. GALLAHER

Treasurer, Clover Mfg. Co.

Editor, Clover Business Service

You may have heard the story about the man who preferred an airedale to any other dog, and when asked why he replied: "Well, you see, an airedale can do anything any other dog can do; then he can turn around and lick the other dog."

I can't help thinking that this same logic applies in the case of the countless thousands of mechanics who have stuck to **Clover Grease-Mixed Grinding and Lapping Compound** for the past twenty-five years—for surely, the old reliable Clover, used everywhere throughout the entire world, asks no odds of anyone—it doesn't have to. It can literally do anything any other abrasive compound can do—and, with due modesty, I believe it can "lick" any of them when it comes down to real honest-to-goodness work and reliability. The fact that



*Quantity as well as  
Quality.*

we have been able to sell some 50 million cans of Clover in the past twenty-five years—that we are selling more to-day than we have ever sold before—is a good enough recommendation for most folks.

If you haven't used Clover Compound, I'd like to send you a large sample with my compliments, as I know, from personal experience in the shop, what it will do, and I want you to know also.

We make **Clover Water-Mixed Hi-Speed Valve-Grinding Compound** too. If you want a sample, just mention the fact, and it will come along in the same package.

*Gallagher*

**CLOVER MFG. CO., NORWALK, CONN., U. S. A.**

SINCE 1903

SAND PAPERS

METAL CUTTING PAPERS AND CLOTH

AUTOMOBILE NICKEL PASTE

METAL POLISHES

CLOVER GRINDING AND LAPPING COMPOUNDS

**E. B. GALLAHER:**

Clover Mfg. Co., Norwalk, Conn.

Send Samples checked ✓

Clover GREASE-MIXED Grinding  
and Lapping Compound . . .

Clover WATER-MIXED Hi-Speed  
Valve-Grinding Compound . .

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Character  
of Business \_\_\_\_\_



(Pennsylvania News continued)

The seaplane, which has a wingspread of 93 feet 10 inches, with a hull 80 feet 11 inches long, is powered with four Pratt and Whitney Hornets, replacing the water-cooled Rolls power plants which carried the ship on its trial flights in Germany.

These two ships are the first of a fleet to be brought to this country from Germany. Stout D and C Airlines, purchasers of the planes, will use these ships for experimental work and to obtain an experience rating based on actual service.

In the spring, five more seaplanes will be ordered, according to the company's plans.

**CENTRAL AIRPORT**, Camden, became the terminal for the Philadelphia air mail September 15. Appropriate ceremonies marked the occasion. J. R. Armstrong was the pilot of the first regularly scheduled air mail plane to land at Central Airport.

**A**N approved type certificate was recently granted for the seven cylinder air-cooled engine developed by Albert R. Jacobs, of Philadelphia. The Aircraft Engine Corporation will soon enter into production of the new engine.

**T**HE Ludington Philadelphia Flying Service, operators of the Philadelphia Airport, recently purchased five Consolidated Fleet ships for student training.

**JACK BARTOW**, J. Story Smith, and a third flier recently became Waco distributors for the Philadelphia territory. A section of the Curtiss hangar at Central Airport has been leased as a sales and demonstration base.

**T**HREE autogiros, of a much higher horsepower than the sport model recently brought to this country and demonstrated in the National Air Races at Cleveland by Juan de la Cierva, inventor of the machine, were entered in the National Reliability Tour by the Pitcairn Cierva Autogiro Company. Due to lack of time for testing the machines, the entries in the Tour were withdrawn.

One of the latest autogiros to arrive in this country reached Pitcairn Field recently. The new ship, manufactured in France, is a four-place all-metal cabin job, and is powered with a Wright Whirlwind 225 horsepower engine. The ship is equipped with side by side dual control.

**A** RECORD for air transportation for Philadelphia was set recently when twenty passengers in four monoplanes left Central Airport for New England resorts. The trip was made on one of the regularly scheduled week-end runs of the Ludington Cape Cod Airway, which has suspended operations for the remainder of this year.

**A** SERVICE to Boston by water and return by air was recently inaugurated by the Merchants and Miners Transportation Company of Philadelphia. Ten Philadelphians made the initial trip. Passengers are privileged to stop over in New York.

**T**HE United States Army Air Corps has awarded a contract for 564 Type B.6 aircraft compasses to the Aircraft Control Corporation of Philadelphia, a division of the Consolidated Instrument Company of America, Inc. This is the latest model aircraft compass of this firm recently adopted as standard for Air Corps planes.

## PITTSBURGH

[BOB COATES]

**A**T the request of Meteorologist W. S. Brotzman, Allegheny County commissioners have voted to purchase a radio receiving set for the weather bureau office. This will enable the local weather man to receive the weather reports radioed every three hours and provide him with a source of information for fliers coming to or preparing to leave Pittsburgh. With present equipment weather reports could be telephoned or wired aviators only twice in 24 hours.

**D**EDICATION services were held for a new airport at Connellsville, Pa., the week end of September 7. The field, including 54 acres, is located on the northwest rim of the city.

**I**N order to connect with the new Cleveland-Washington route of Clifford Ball, schedules of the Middle States Air Lines were changed early in September. Middle States planes meet the northbound Ball planes from Washington at Pittsburgh, and transfer passengers flying between Akron, Toledo, or Detroit and Washington.

**T**HE new 700-acre airport of the Main Aeronautics Company, southeast of Greensburg, Pa., was dedicated the week-end of August 20. M. R. Scharff, president of the Main firm, presided. Livingston Clewell handled broadcasting at the field. Commercial pilots from the district attended, as did army, navy and marine fliers.

**D**. BARR PEAT and C. K. Wallon recently announced that they have obtained a lease on 1,000 acres at Akron, O., which they will convert into an airport. The field, according to Mr. Peat, is 11 miles from the city. It also was announced that a flying school would be established there.

**F**ORTY-FIVE students awaited the opening of the Pittsburgh School of Aviation the first of the month, according to Bob Trader, manager. Fifteen of these are in the welding classes; a like number are in the wing-building and engine mechanics classes.

**B**ETTIS FIELD at Pittsburgh has been purchased from Aircraft and Airways of America by the Curtiss Airports Corporation, and will be improved to provide adequate ground facilities for a flying service base and transport company terminal.

Plans for the improvements have been completed and work has been started on grading of the field. Grading will involve the removal of 425,000 cubic yards of earth. An artificial drainage system will be laid and hard-surface runways will be con-

structed. Two large hangars will be built, and a central terminal building will be established with offices for weather bureau, post office, express company, telegraph and telephone companies. The building will include, also, offices for the sale of transport and sightseeing tickets, radio station and passenger waiting rooms. Control over arriving and departing planes will be maintained from a tower rising from the terminal building.

**WILLIAM F. OGLESBY** of Mt. Washington, Pa., was awarded a six week's course in flying at Curtiss Field, Long Island, in a recent aviation essay contest. The award included transportation to and from the New York field.

**A** C. THOMPSON, Jr., former army pilot and member of the 334th Observation Squadron, has been placed in charge of the airplane and aviation motor sales department of the Pierpont Motor Co. of Pittsburgh.

**W**ORK of completing the grading work on the new Pittsburgh Municipal Airport, on Lebanon Church Road, is progressing. Two hundred men are employed on the site, with 16 steam shovels and 34 trucks. It is expected work of leveling the field will be completed before Christmas.

**T**HE Main Aeronautics Company of Pittsburgh was recently appointed distributors for Pennsylvania of the Ryan planes. The Main Company owns an airport at Greensburg, Pennsylvania, 28 miles from Pittsburgh.

**T**HE Pittsburgh Aircraft Agency Corporation, distributors for Fleet airplanes in western Pennsylvania, has appointed the Wolf Flying Service, Inc., at Williamsport, Pa., dealers for that territory.

## VIRGINIA

[C. N. SNEAD]

**T**HE Airways Division of the Department of Commerce has been conducting a series of tests to determine the performance of a new wind generator for use in connection with beacon lights located in isolated areas along the nation's airways. The tests have been made near Alexandria, Va.

**T**HE common council of Richmond, Va., has unanimously adopted a resolution favoring the establishment of an airport suitable for landing dirigibles as large as the Graf Zeppelin. The city hopes to be chosen as the terminus in the western hemisphere for the proposed transatlantic dirigible service. If Richmond is chosen, an ordinance would be passed providing for the purchase by the city of a tract of land ranging in acreage from 700 to 1,000 acres, the erection of buildings and mooring masts and other anchorage paraphernalia, the possible erection of an airport hotel, and the extension of the present city gas mains to the airport.

# Would You, Too, be a Transport Pilot?

Would you like to join the bronzed young men who are flying the airplanes of America—and of the world? Would you like to share in the amazingly high salaries they are earning—assure yourself of an income which doctors, lawyers and professional men attain only after many long and hard years of study and work? Would you like to follow a profession that is as enjoyable as a game—that will keep you young, clear-eyed and athletic?

## Then Come to Parks College

Take your training at the school that *without a minute's preparation* PASSED the Department of Commerce examination for approval as a Transport Ground and Flying School. Learn to fly at the largest aviation school in America—the school that has led the aviation industry in its drive for thorough and reliable training of pilots—the school that is internationally recognized as the outstanding aviation educational institution of the world.

Take your flight training at the hands of instructors who have seen hundreds of other young men go to success under their guidance. Parks flying instructors are highly specialized students of their profession. They know the best way to handle each new flyer—know how to carry each most swiftly and competently through the training that leads to Federal licenses and jobs at big pay. Similarly, Parks airplanes and shop equipment are the finest in the land—your guarantee of the finest training to be found anywhere in the world.



## A Transport Ground Course for Every Student

Unlike other schools, Parks Air College is not content with the minimum of ground school instruction. Every graduate of Parks Air College Flying School, whether he be a Limited Commercial Pilot or an aspirant for a Transport Certificate, is qualified to pass the United States Department of Commerce written examination for a Transport License. That is in line with the unyielding determination of Parks Air College to qualify all its students, regardless of the length of their course, for ultimate participation in commercial aviation.

Remember, however, that it is the man who gets into aviation NOW, while the business is young, that will cash in most heavily on the returns that aviation offers. Get into the game, then, today. Fill out the coupon and let us send you the story of Parks and *what it means to you*.



Largest Civilian Air School in America!  
BOX 226-PU EAST ST. LOUIS, ILL.

Member Aeronautical Chamber of Commerce of U. S. A.

*Parks Air College has been rated by the Aeronautics Branch, Department of Commerce, as an Approved Transport Ground and Flying School*

## MAIL THIS TODAY!

PARKS AIR COLLEGE,  
Department 226-PU  
East St. Louis, Ill.

Send me your illustrated catalog. I am interested in Aviation.

Name.....

Address.....

City.....State.....



## CONNECTICUT

THE Russell Manufacturing Company of Middletown, Conn., recently opened a new plant at St. Johns, Quebec, for the manufacture of brake lining, clutch facings, transmission lining, cotton cloth for airplane wings, aero rubber shock cord, parachute shroud lines, and aviators safety belts. The plant is capable of turning out a mile of brake lining every hour, or over 600,000 feet a week. This Canadian factory will take care of the company's export business.

MILTON HAMON, manager of the Bridgeport Airport at Stratford, Connecticut, was recently notified by the National Aeronautical Association that he had, on August 24, established a new world's altitude record for airplanes powered with Curtiss OX-5 engines. Hamon made his record flight in a Curtiss OX Robin cabin monoplane at the Bridgeport Airport. His record, according to the barograph reading, was 19,593 feet. The previous record was 18,660 feet, made by P. H. Spencer, in a similar plane at Boston, Mass.

## MASSACHUSETTS

THE Davis V3 monoplane is distributed in the New England market by the newly appointed distributor, Walter S. Rogers and Associates, of Boston. A tour of demonstration has been launched by the Rogers group and the plane inspected by many pilots at the various fields. Boston is the headquarters of Walter S. Rogers and Associates, with operations maintained from an airport located on Cape Cod. Guy A. Ham, formerly pilot and sales representative of the Porterfield Flying School, Kansas City, Mo., has joined the New England distributor and is assisting in the sales work.

## NEW JERSEY

THE Farman Aircraft Corporation will build an assembly plant for 25 and 50-passenger transport planes at the Central Airport, Camden, N. J., according to S. Ludington, president of the Camden aviation field. The airport executive also announced that the Kellett Aircraft Company is arranging to build a plant on Central Airport

for the construction of autogiros under a patent license from the Pitcairn-Cierva Autogiro Company.

The main plant of the Farman organization in America will be in Wheeling, West Virginia, but the assembly work will be done on the Camden field which will also be the demonstration base for the passenger ships.

## MARYLAND

THE old Belfort Observatory, experimental laboratory of Julien P. Friez and Sons, Inc., Baltimore, manufacturing and research division of the Consolidated Instrument Company of America, Inc., is to be demolished and a three-story addition erected on the site. The addition to the Friez plant will consist of three stories and will include more than 15,000 square feet in area. Belfort Observatory was erected about 175 years ago.

### Berliner-Joyce Working on Five Government Orders

IN less than three months after organization, the Berliner-Joyce Aircraft Corporation of Baltimore had been given five contracts from the United States air services, four from the Navy and one from the Army. Among the projects entrusted to this company is a contract to build a single-seat fighter for the Navy that will be constructed altogether of metal. This plane will offer a definite advance in both structure and performance, employing monocoque construction. In addition to added strength, it will weigh less than the conventional tubular steel construction. This plane will, according to the plans, be faster than any now used in the Navy service and will have a fast rate of climb. Other contracts from the Navy are for a new design of an observation plane for use on light cruisers, a production order for wooden pontoons and wing floats, and a contract for a set of experimental stainless steel pontoons.

A two-place pursuit plane is now being built by this company for the Army. Present pursuit planes carry only a pilot, whereas this new plane will carry a gunner besides the pilot. It will be equipped with three machine guns and special oxygen equipment for its crew when flying at the high altitudes the plane will be capable of reaching.

## INDEPENDENCE COMPANIES SUPPORT NON-STOP DERBY

THE Independence Indemnity Company of Philadelphia awarded Henry J. Brown a prize of \$2,000 as winner of the non-stop race from Los Angeles to Cleveland in the National Air Races after having underwritten the entire non-stop derby. Brown piloted a Lockheed Air Express in the race at an average speed of 156.4 miles per hour, covering the distance in 13 hours, 15 minutes, 7 seconds. The Independence Company received the following letter from Brown: "Please believe me grateful to you and your company for your interest not only in this flight, but in the whole field of aviation as well. Some day I know you will be amply repaid for your foresight."

## RHODE ISLAND

[THOMAS F. BRESNAHAN]

ANNOUNCEMENT has been made by Ray C. Van Arsdale, president of the newly formed Eastern Aircraft Corporation of Pawtucket, and William Messerschmitt of the Bavarian Aircraft Corporation of Germany that production of two types of German all-metal cabin monoplanes will begin in Rhode Island city in October. The types of planes to be built include a three-place cabin monoplane and seven-place cabin monoplane.

The company has purchased the plant of the Pressed Metal Company adjacent to the What Cheer Airport of Pawtucket. Wright motors will be used on the larger planes. To date no power plant has been accepted for the smaller job, although several are under consideration. The Messerschmitt all-metal planes are of the high wing cantilever monoplane type.

The What Cheer Airways, owners of the What Cheer Airport in Pawtucket, has purchased 27 additional acres which will be added to the port as soon as possible, thus making the area of the field 150 acres. Runways more than 3,000 feet in all directions will be installed as soon as the newly acquired land is levelled off.

SUPERINTENDENT of Schools James S. F. Rockert of Woonsocket, R. I., has recommended the formation of ground courses in aviation in the public schools of that city. Through the efforts of Congressman Jeremiah E. O'Connell, the school department has received from the government an airplane motor and parts of the wings and undercarriage for instruction purposes in the new courses.

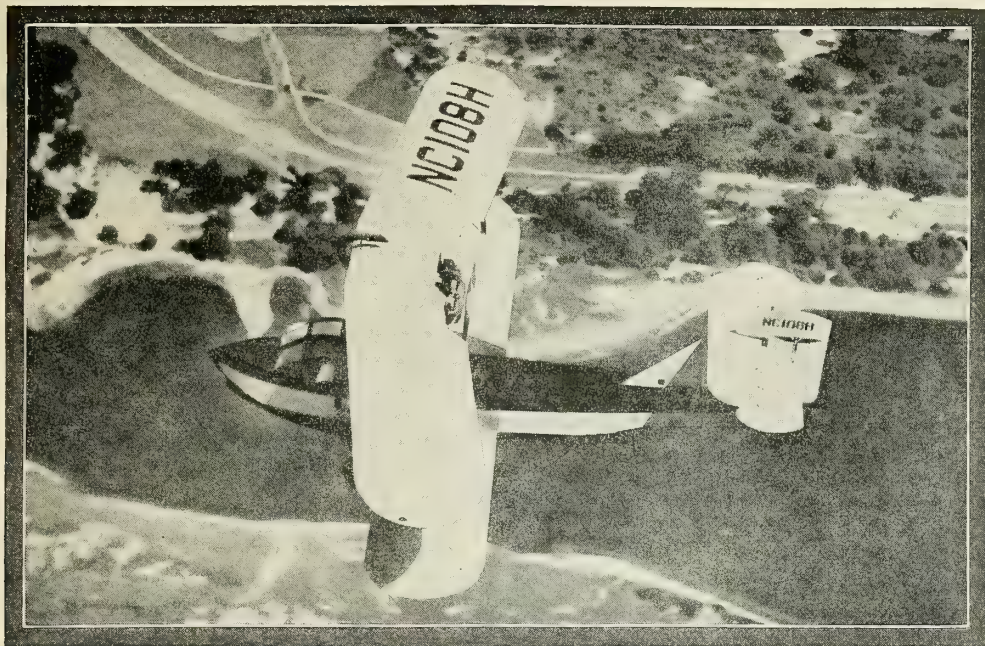
THE Woonsocket Chamber of Commerce has obtained an option on 67 acres of land located two and a quarter miles from the center of the city for the development of an airport. The option was secured by Paul Smith, chairman of the chamber's committee on aviation. It is understood that the price of the land is \$21,000.

The field is located on three highways off  
(Continued on next page)



Vought Corsair used as the official plane of the Connecticut State Dept. of Aeronautics





# Ireland Neptune Amphibion

**A practical 5-place  
transport plane for the land  
and water routes**

**U**P AND DOWN America's coasts... over her countless waterways... wherever land and water meet... you find the Ireland Neptune answering aviation's transport problem.

It has been on the airways only a year. Yet already production has had to be stepped up... to meet the growing demand of transport companies that need just this type of plane on many of their routes. Companies that find it such an ideal ship for limited transport and charter service in a country where so much travel is over water.

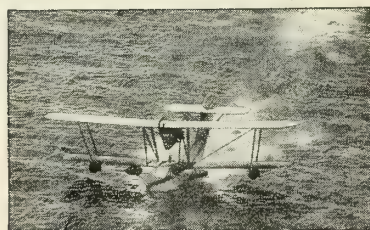
The Neptune's 5-place all-metal hull is light and strong. It will not become water-logged like so many of the wooden hulled planes.

Powered with the Wright J-6 (300 H.P.), it has a cruising range of 480 miles at a cruising speed of 96 miles per hour. Top speed, 105, and service ceiling 14,000 feet. With the Pratt and Whitney Wasp (425 H.P.) it develops a top speed of 119 miles per hour, ceiling of 18,000 feet, and can cruise 500 miles at 104 miles per hour.

Add to these features the innate stability... the utter comfort and ease of handling for which the Neptune is noted.

You have a plane that instills in your passengers a feeling of confidence and absolute security. The factors in aviation that mean consistent, increasing business.

And remember. Complete, quick service is always available at any one of the Curtiss Flying Service fields. There are



*Neptune lands at moderate speed and takes off easily and quickly from either land or water.*

forty of them throughout the country. One or more within easy flying distance of your field.

Write or wire for complete information on the Neptune and on Curtiss service. Curtiss Flying Service, Department 6, 27 West 57th Street, New York City.

Sales agents for Curtiss-Robertson Airplane Mfg. Co., Cessna Aircraft Co., Curtiss Aeroplane and Motor Co., Incorporated, Ireland Aircraft, Incorporated, Command-Aire, Inc., Moth Aircraft Corporation.

## CURTISS FLYING SERVICE

*"World's Oldest Flying Organization"*



(Rhode Island News continued)

Diamond Hill Road with clear approaches on all sides. It is located on high land with good natural drainage. Contemplated purchase of adjoining land will enable the backers of the project to have a square field with runways in four directions 2,500 feet long. As the charter of the Chamber of Commerce prevents that organization from managing the field, a corporation of local business men will be formed for that purpose. Clearing of the site and construction of runways, hangars and other buildings will begin immediately so that the airport will be ready for business by Spring.

THE European Challenge race of 6,000 kilometers held recently was won by the Bavarian Aircraft Company, of Augsburg, Germany, with their M23 plane, a two-place sporting and training monoplane designed by Willy Messerschmitt. Messerschmitt is the designer of the all-metal planes to be built at the plant of the Eastern Aircraft Corporation in Pawtucket, R. I.

AT the What Cheer Airport, Pawtucket, work of clearing the 30 additional acres recently purchased has begun. When this land is added to the field, it will comprise almost 160 acres of cleared landing area with clear approaches on all sides.

A six-room bungalow has been erected next to the administration building of the Curtiss Flying Service for the convenience of visitors to the field. The buildings on the airport now comprise a pilots' house, hangar, administration building and rest house and refreshment stand. Fire fighting equipment has been installed and telegraph and telephone service made available. George Cohen is now chief mechanic.

## WASHINGTON, D. C.

[WING OVER]

A REVOLVING beacon and flood lights are to be installed at Hoover Field soon, according to general manager John Wynne of the Potomac Flying Services. It is thought that the Pitcairn mail route from New York to Atlanta will change its local base to Hoover from Bolling Field when lighting facilities are installed at the former field. The operators of Hoover Field are using a Curtiss Sea Gull flying boat from their base at Hains Point, and have been carrying an increasing number of passengers.

The Eastern Air Express may also use Hoover Field. It is planned to operate this route from New York to Miami, which with Coastal Airways, Pitcairn, and the Clifford Ball passenger airline to Cleveland and Pittsburgh, will give Washington four routes on the airways map. All of these are scheduled for operation from Hoover Field.

THE New York-Washington service has been discontinued pending the enlargement of Washington Airport. The field is being extended so that there will be more room for the Lockheed planes operated by the company to land and take-off. Two

models powered with Pratt and Whitney engines have been purchased for the New York run. Howard French, formerly instructor of the D. C. Air Legion is now on the staff at Washington Airport.

THE NATIONAL Road Builders Association meeting on airports is to be held at the Willard Hotel in Washington during October. Colonel Harry Blee, Chief of the Airports Division of the Aeronautics Branch, will preside and one of his assistants, A. Pendleton Talliferro, Jr., will deliver a paper on airport management.

THE Department of Commerce announces the promotion of J. W. Davis, Jr., formerly Assistant Trade Commissioner for Aeronautics at Rio de Janeiro to a position in the Aeronautics Trade Division in Washington. Mr. Davis, who was a flier in the French army during the War and who holds the rank of Captain in the Marine Aviation Service, did valuable work in Brazil for American aircraft manufacturers. He will specialize on the export phase of the division's work and is expected to concentrate his efforts first on the Latin American markets.

## SO. CAROLINA

AN airway marker has been placed in Greenville, by the local chamber of commerce. On two sides of one of the roofs of the Greenville Cotton Compress Building in chrome yellow on a black background with letters 17½ feet high, is the name Greenville, with a meridian marker and an airport pointer. At the proposed airport is a 100-foot diameter circular field marker with a four-foot white rim and a wind indicator.

## ALABAMA

THE Birmingham Junior Chamber of Commerce has secured the services of an airport engineer and will offer these services to cities and towns in Alabama in building airports. There will be no charges, according to Gordon Kuster, secretary of the chamber.

The organization has been doing some very active work recently in Alabama toward the development of aviation.

A DIRIGIBLE hangar is to be erected at Gadsden, Ala., by the Goodyear Tire and Rubber Co. The rubber company will build the hangar on the property adjoining its southern manufacturing plant. A mooring mast will also be built.

THE Montgomery School of Aeronautics, Montgomery, Ala., is operating a passenger service between Montgomery, Columbus, and Atlanta on Mondays, Wednesdays and Fridays. The equipment of the firm includes a six-place Ryan, a five-place Stinson-Detroiter, and five American Eagle three-place biplanes. L. G. Mason is presi-

dent of the concern, Dr. Clarence K. Weil, vice president, and John L. Goodwyn, secretary.

## FLORIDA

[JOHNSON WRIGHT]

THE Miami Aero Club has received its second training plane and 58 members of the flight squadron are receiving flying instruction. Arthur E. Curtis is president of the Club and Lewis Stone and T. T. Kelly are the instructors.

L. HERMAN BARON, from Salvador, and M. Gelabert, from Panama, have made their solo flights. They are two of the representatives from four Latin American countries that have sent representatives in response to the offer of the Tampa Chamber of Commerce to give a representative of each country a free course in flying. They are receiving their instruction at the McMullen Flying School. The other two students, Thomas Letona, from Guatemala, and Jose R. Aguilar, of Honduras, are also taking flight training.

THE Miami All-American Air Meet for 1930 will be held on January 13, 14 and 15. It is planned to hold an aeronautical exposition in connection with the air meet. Extensive improvements have been started at the municipal airport for the event.

THE Curtiss Flying Service, Inc., is starting construction on a \$50,000 hangar and terminal station at the Miami Municipal Airport. The City of Miami leased the property to the Flying Service for 15 years at a yearly rental of \$1. At the expiration of the lease the building will become the property of the city. The new building will be of Spanish architecture, two stories high, and a complete repair shop will be maintained in addition to quarters and offices for the flying school. The property on which the municipal airport is located was given to the City of Miami by Glenn H. Curtiss.

THE McMullen Aircraft Corporation of Tampa, Fla., has been appointed a dealer for the Great Lakes Aircraft Corporation of Cleveland.

[JOHN M. MURRAY]

INSTALLATION of a 160-acre airport for Cocoa, Florida, is now being finished. When completed, the airport will be one of the most accessible and adaptable in the state. The airport is located less than one mile from the post office, and within easy walking distance of the business section of the city.

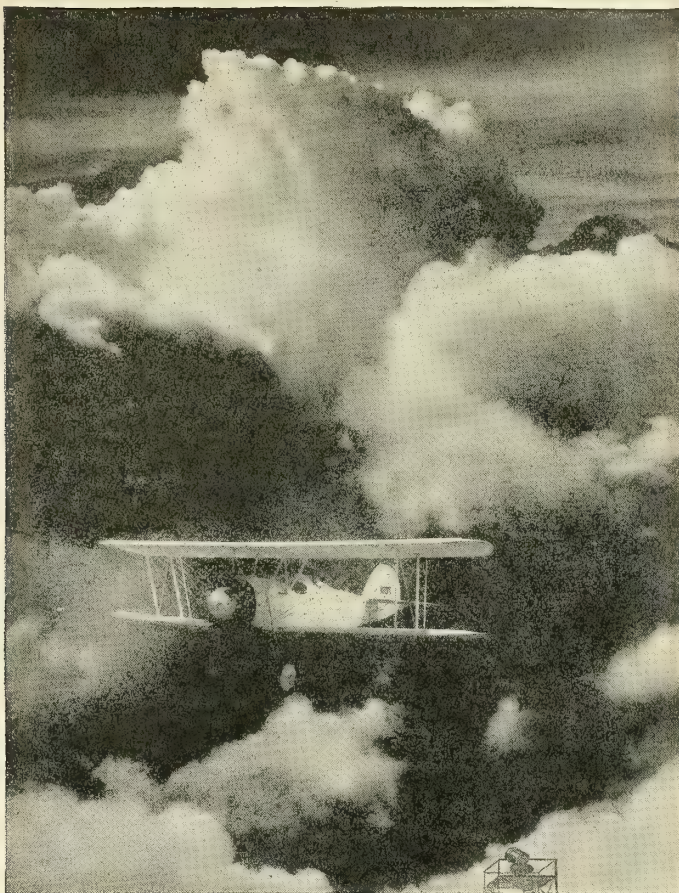
The port is to be lighted with government regulation boundary lights, an approach light and a beacon for night flying. The regulation airport landing circle is built in the field. Preparations are being made to stage a celebration in November when the airport is formally dedicated.



APPROVED BY THE  
U. S. Dept of Commerce



## FAR AHEAD - *in Making* Master Airmen



It is more than a coincidence that the four great masters of the violin today have received their training from one great teacher . . . Leopold Auer. And all four of them openly attribute their genius to the infinite and painstaking care with which he guided their eager ambitions.

Becoming a master airman is a similar process. Every pupil requires careful and individual attention. The instructor's efforts must be concentrated on one pupil at a time. Human nature, with its individual habits . . . its fears, its eccentricities . . . demands endless patience, tact and a keen ability in materializing latent desires into faultless flying technique.

Embry-Riddle instructors have been carefully chosen from a field that was nation-wide. Actual air-performance was only a part of

their requirements. In addition to being Master Airmen, they are **MASTERS OF THE SCIENCE OF TEACHING.**

### Approved by U. S. Department of Commerce

The unquestioned success of Embry-Riddle training methods was certified recently by the U. S. Dept. of Commerce. This is a definite assurance to Embry-Riddle Students that their training conforms to the highest government regulations. These supreme standards, however, were an inherent part of the various courses long before the authorities demanded them.

Embry-Riddle Graduates enter the aviation field equipped for brilliant careers. Transport and commercial flying, maintenance, plane

construction . . . in fact, all the requirements of master airmen have been most carefully developed. Embry-Riddle Graduates are recognized nationally because the school itself is unsurpassed.

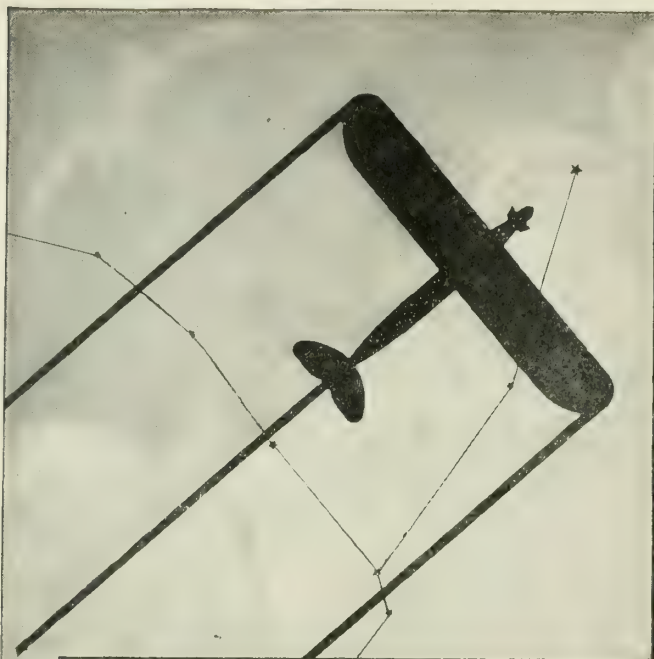
Regardless of what course you choose . . . primary ground school, advanced ground school, private pilot's, limited commercial or transport . . . you are assured of personal and individual instruction designed to place you in the uncrowded ranks of master airmen, capable of filling the best-paying positions in the most romantic of all the industries in the world today.

*A personal note from you will bring more detailed information about the outstanding features of the Embry-Riddle School. Write for it today.*

**EMBRY-RIDDLE SCHOOL OF AVIATION**  
Lunken Airport [Subsidiary of the Aviation Corporation] Cincinnati, Ohio







# WHO

Last year this country produced almost 4000 commercial planes. During the first six months of 1929 nearly 3000 commercial planes have been sold. There are plenty of money-making opportunities in the sale of commercial planes.

To a limited number of men possessing moderate capital, Colonial Flying Service offers

such an opportunity:—exclusive agencies in New York State and New England for Fleet, Fairchild, Challenger, Pitcairn and Standard planes.



The advantages of a Colonial franchise are found in the answers to the three questions you would ask, no matter what agencies you might be considering. 1. Who buys planes, anyway? 2. Do the planes meet the demands of this market? 3. Who is the company granting the franchise and to what extent can it be helpful in marketing the planes?

1. The market for the sale of planes consists of (a) Training schools and student fliers, (b) Business organizations, (c) Private owners, and (d) Operators for charter service and passenger hopping.

2. The following are the specifications of the planes for which Colonial franchises are offered: FLEET—Model 1, Price \$5485 F. A. F. Model 2, Price \$4985 F. A. F. A development of the training plane used by the Army, Navy and Marine Corps. A splendid



# COLONIAL

# BUYS PLANES ANYWAY?

instruction ship. Dual control. Warner "Scarab" 110 H. P. or Kinner 100 H. P. motor.

CHALLENGER—Model KR 21A, Price \$4685 F. A. F. A tapered wing, two-place plane for the private owner. A small, fast sport ship. Dual control. Kinner 100 H. P. motor.

CHALLENGER—Model KR 34A, Price \$6575 F. A. F. An ideal three-place fast open plane for cross-country flying. Dual control. Wright J6-165 H. P. motor. Brakes.

PITCAIRN—Sport Mailwing. Price \$8500 F. A. F. The last word in design refinement and sturdy construction. A three-place open plane. Dual control. Wright J5-225 H. P. motor. Very fast. Brakes.

FAIRCHILD—Model 71, Price \$18,900 F. A. F. A cabin plane for pilot and 6 passengers. Ideal for charter operation and for business concerns. Wasp 425 H. P. motor.

STANDARD—Model D-25, Price \$9750. A five-place open plane for passenger hopping from all types of fields. High load capacity. Quick take-off. Low landing speed. Removable dual control. Wright J5-225 H. P. motor. Brakes.

How well these planes cover the market may be judged by this partial list of owners: Donald Woodward, LeRoy, N. Y. FLEET dealer. Has bought 5 ships. 4 are being used for instruction. One has been sold to Wm. Sloan, Rochester, N. Y. Lorillard Spencer, Newport, R. I. owns a ship for personal use. Danbury Aero Club, Danbury, Conn. Purchased a biplane for private instruction. Newport Air Transport, Newport, R. I. Purchased a five-place open plane for passenger hopping. H. & H. Aerial Services, Inc., West Haven, Conn. Bought two biplanes for student instruction. Harris Whittemore, Jr., Naugatuck, Conn. Purchased a biplane for experimental work.

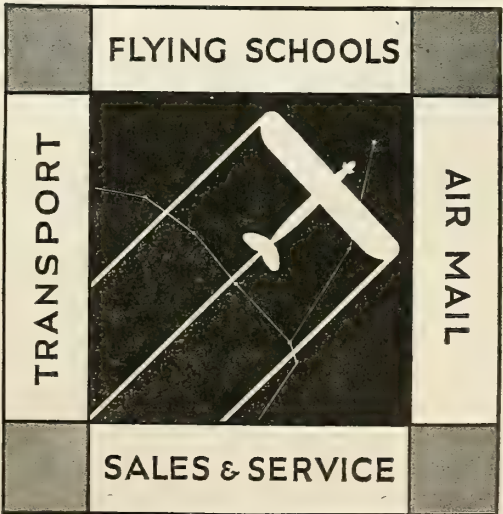
3. Colonial is identified with the earliest operation of the Air Mail. Contract Air Mail Routes 1 and 20, and Foreign Air Mail Route 1 are all operated by Colonial companies. Passenger Transport Lines between New York and Boston, New York and Montreal and Buffalo and Toronto are a part of the Colonial System. Colonial Flying Schools are maintained in New York State and New England.

With this background Colonial is able to advise its dealers on all subjects connected with the operation of a successful sales agency. A Colonial franchise covers not only ships but everything pertaining to their operation and maintenance. Affiliation with an established flying field can be arranged. Write for territories available and conditions for securing an agency.

## FLYING SERVICE INC.

DIVISION OF AVIATION CORPORATION  
270 Madison Avenue, New York City

District Sales Offices—BOSTON, BUFFALO,  
HARTFORD, SCHENECTADY





## GEORGIA

[LIEUT. F. E. DAVENPORT]

### Mason and Dixon Airlines to Start Detroit-Atlanta Service

THE air transport facilities of Atlanta will soon be enhanced with the beginning of service by the Mason and Dixon Airlines, Inc., operators of the new Atlantic-Cincinnati-Detroit route, it was announced recently by E. W. Savage, vice-president of the company. It is planned to place the service on a schedule of two planes a day each direction. Scheduled time between Atlanta and Cincinnati will be three hours and thirty minutes, and between Atlanta and Detroit five hours and a half on a through schedule, and six hours and fifteen minutes on an intermediate stop schedule.

Flamingo all-metal eight-place cabin monoplanes, powered with 425-horsepower Pratt and Whitney Wasp engines, will be used. Until the company decides to build its own quarters, hangar facilities have been arranged for with Beeler Blevins at the Atlanta airport. Stops on the intermediate schedule include Knoxville, Middleboro and Lexington, and will be so arranged that passengers from Atlanta, leaving in the morning, may have a day of business in Cincinnati, returning the same night. The company will stress air express business and will encourage daily shipment by means of low poundage rates. The company has also petitioned for air mail contracts.

### Seaboard Airways Plans Airline

A NEW air route to Havana, Cuba, via Atlanta, will be in operation in less than sixty days, according to announcement of Warren B. Ferris, president of the Seaboard Airways, Inc., which will operate the route. The schedule calls for dawn-to-dusk flights from Columbus, Ohio, to Havana, and from Havana to Columbus, with Atlanta included as a mid-way point on the route and later to become a terminal for a projected airline to New Orleans and Mexico. Other stops on the Columbus-Atlanta-Havana route, will be Jacksonville, Tampa, Miami and Cincinnati.

Fourteen all-metal 32-passenger twin-motored planes are under construction with the Uppercu-Burnelli Corporation, with delivery of the first plane scheduled for November 15, when it will be christened the company's flagship. On the long haul, the planes will carry only 20 passengers and a crew of three men. The planes will be powered by two Isotta-Fraschini motors, with a maximum speed of 150 miles, a cruising speed of 128 miles and a landing speed of 52 miles per hour.

The company's program includes the construction of a large air terminal and radio station at the Atlanta Airport. The schedule calls for an 11-hour run from Columbus to Havana with the fare at 12 cents an air mile, making the rate from Atlanta to Havana \$92.50 one way and \$175 a round trip. From Atlanta to Cincinnati, the fare will be \$45 and to Columbus, \$55.80.

THE general contract for the new hangar of Pitcairn Aviation, Inc., at Candler field, Atlanta, has been let to Gilbert Beers, an Atlanta contractor, and the roofing contract to the Birmingham Construction Company, of Birmingham, Ala. The cost will be \$58,000 and construction will start as soon as the grading, incident to the moving of Beeler Blevin's hangar, has been done. The Blevins hangar is to occupy a new site on the field.

Plans for the new structure, which is to be completed by January 1, call for a storage space of 120 by 120 feet. It will accommodate four tri-motored ships and ten small planes. The company will transfer its shops from Richmond, Va., to Atlanta as soon as the building is completed.

TOURIST sight-seeing service is planned for the Okefenokee Swamp by M. Dewey, of Folkston, and E. W. Hightower, Jr., of Atlanta, who have applied for a charter as the Okefenokee Flying Service, with capital stock of \$25,000. It is planned to operate a gas station and restaurant in connection with the tourist service.

A NEW airport was dedicated September 14th at Winder, Georgia. The new field was made possible by the promoters of the North Georgia Fair who located the new field in connection with the fair grounds, just beyond the city limits. Doug. Davis, southeastern manager for the Texas Transport Corporation, took part in the dedication of the airport.

THE Chamber of Commerce of Moultrie, Ga., is completing plans for a municipal airport there, according to a recent report. The immediate program calls for the construction of two runways, one 2,160 feet long by 200 feet wide, the other 1,400 feet long by 100 feet wide. The courtesy extended by the All Georgia Air Tour, when the ships circled over Moultrie, was reported to be a big factor in stimulating the interest which has resulted in the present progress of the work.

## ARKANSAS

[CARL OLSSON]

CITIZENS of Little Rock by a vote August 19 authorized the issuance of \$200,000 in bonds for the establishment of a modern airport, culminating efforts of the Chamber of Commerce and the city administration for nearly two years to provide adequate aviation facilities for the city. The present airport, operated by the government, is considered inadequate for the trend of aviation.

Plans of the city administration call for a landing field comprising 600 acres that will be located about four miles from the business section of the city. A paved street and a hard surface highway reach the section. Only a small amount of work will be necessary before the field is available for landing large planes. Improvements to the proposed field including an administration building, hangars, shops, grading and drainage are

expected to cost \$40,000, the balance being the approximate cost price of the land. The present airport, less than two miles from the business section, contains 90 acres and has several buildings, including two hangars.

ESTABLISHMENT of the proposed southern transcontinental air mail line is expected soon from Washington, the only requirement having been the lack of a suitable landing field at Little Rock. Assurance that the proposed line would extend from Cleveland to Dallas by way of Louisville, Memphis, Little Rock and Texarkana was conditioned on a field at Little Rock. Now that a suitable field is in view for Little Rock, it is believed the air mail line will be established.

OPERATION of daily passenger service from Little Rock to Shreveport has been started by the Tri-State Air Transport Company, two round trips being made each day except Sunday. Stops on the line are made at Pine Bluff, Camden and El Dorado. Planes leave both terminals in the morning and afternoon.

## LOUISIANA

[HAROLD A. DEMPSEY]

A NEW airport is being established on Avery Island which is on a direct air line between New Orleans and Houston. Dudley Avery and W. A. McDonald are in charge of the erection of the new port. Due to the condition of the soil, very little construction work is needed to convert the place into an all-weather landing field 2,400 feet square. Years of washing of waste salt, a by-product of the mines on the island, has left a hard sandstone surface. The island is less than ten miles from New Iberia, La., and will serve as an emergency landing place for that city.

THE growth of air travel about New Orleans is given in the statistics of gasoline sales at the Wendell-Williams airport. When the present operators took the station over four months ago, monthly sales of gasoline amounted to 2,500 gallons. During the month of August these sales reached 6,000 gallons.

The Wendell-Williams port recently augmented its passenger service by establishing weekly runs to Grand Isle. The service has enjoyed heavy patronage. New equipment is being added, the latest addition being a baby amphibion of Italian design. This type will without doubt prove popular in Louisiana, which is so liberally supplied with bodies of water.

THE formation of a new air line in New Orleans, La., to be known as the New Orleans Air Transport, Inc., has been announced. A capitalization of \$250,000 is represented, with Frank R. Smith, president of the new firm. The company plans to engage in all lines of flying activities. Other officers of the company are Arthur B. LaCour, vice president; William H.

(Continued on next page)



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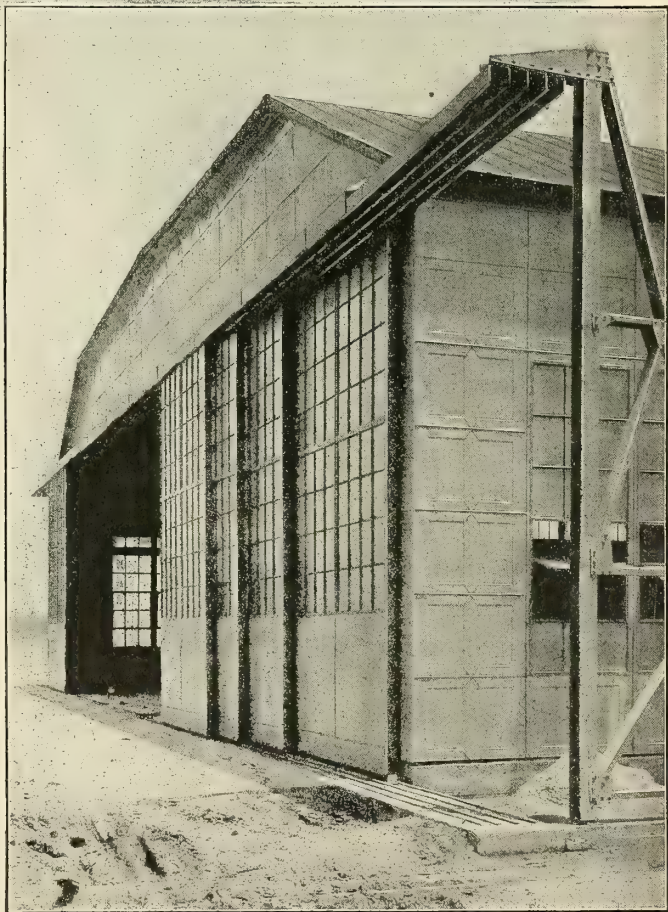


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# TRUSCON HANGAR DOORS



(Louisiana News continued)

Hoefgen, vice president; H. J. Cole, vice president; and Douglas O. Langstaff, secretary and treasurer.

[C. F. Cook]

WITH the development of aviation in Louisiana proceeding rapidly, the Louisiana State Chamber of Commerce is preparing to foster further progress by the organization of an aeronautical committee. The executive committee of the body met recently at New Orleans and authorized A. H. Henderson, president, to appoint an aeronautical committee. Improvement of the airports of the State and the bringing of additional aerial traffic to Louisiana are the objects of the committee, which will be composed of leaders in the aviation field.

ARRANGEMENTS have been made by J. W. Cronk, meteorologist of the United States weather bureau in Shreveport, to supply weather information to airlines operating in northern Louisiana. Mr. Cronk recently went to Chicago where he made an investigation of methods of furnishing these reports.

DAILY air passenger service has been established between Shreveport, La., and Little Rock, Ark., by the Tri-State Air Transport Company. Planes make stops at El Dorado, Camden, and Pine Bluff, Ark. Ryan monoplanes are used on this line, of which W. O. Wilson is manager.

Connections are made by the line with airlines operating south to New Orleans and east and west from Birmingham to Dallas.

THE Delta Air Service, Inc., of Monroe, La., has extended its passenger airline to Birmingham, Ala., and a straight route is now open from Birmingham to Dallas. This line also operates a passenger service from Jackson, Miss., to Dallas by way of Monroe and Shreveport.

PLANS are being made by citizens of Natchitoches, La., to establish a municipal airport on a 100-acre tract which will be selected by officials of the Department of Commerce. A hangar 100 by 80 feet is planned. A bond issue of \$35,000 to finance the project will be voted on.

HALF a day will be cut from the present connection time between Chicago and New Orleans by the new Lakes-to-the-Gulf air-rail line which will start operations shortly, according to an announcement by the Continental Air Services, Inc., which will operate the line. Preliminary surveys of the 900 mile route have determined that land planes will be flown from Chicago to Memphis and amphibians from Memphis to New Orleans.

Planes with provision for from six to eight passengers will be used over the two routes, the flat country from Chicago to Memphis and the Mississippi River route from there to New Orleans.

## KENTUCKY

### American Legion Convention at Louisville

By J. ROGERS

SIXTY army, navy and marine planes, as well as numerous civilian planes will take part in the daily air shows which will be held in Louisville during the national American Legion Convention, to take place in Louisville September 30 to October 4, it was announced by Tyron Mengel, chairman of the Committee on Aviation. The show will be built around military units of the air service. There will be forty-three army planes and eighteen navy planes, as well as six marine corps planes.

The air show will be free to the public and will be held at Bowman Field each afternoon during the convention. In addition there will be night flying features every night. These night flying planes will carry flares and sirens. Another event planned for the meet is a sham aerial battle in which the planes will be equipped with machine guns, devices to make smoke screens and all the latest apparatus of aerial warfare. The eighteen navy planes of the Highhat division will repeat the maneuver shown in Cleveland of three planes tied together, taking off and landing as one unit. During the convention the dirigible *Los Angeles* will pass over the city.

## LOUISVILLE

[A. W. WILLIAMS]

THE municipal building, erected by the Louisville & Jefferson County Airboard, on Bowman Field, at Louisville, was recently completed and placed in service.

THE Paducah Air College, of Paducah, Ky., has recently incorporated with capital of \$30,000, with plans for operating an aviation field, handling air transport business, and student instruction. C. R. Iseman, C. G. Vahlkamp, George H. Goodman, E. C. Mitchell, and W. F. Bradshaw were the incorporators.

THE Airport Committee, of the Hopkinsville Chamber of Commerce, has been conducting a stock sale to raise \$25,000 with which to finance the purchase or lease of property for an airport. The Harned farm is under consideration. Carol Baker, president of the Hopkinsville Chapter, Kentucky Aero League, has been active in the move.

IT was recently announced at Lexington, Ky., that the Dixie Davis Flying Service, Inc., of Cincinnati, had employed Woodford Baxter, pilot at the Lexington aviation field, as instructor for a new flying school at Lexington, the first in the Bluegrass district.

W. J. MCKENZIE, of the Bureau of Aeronautics, U. S. Department of Commerce, recently made inspections of landing fields on the Cincinnati-Knoxville route, at Lexington, Berea, Livingston, and Corbin, and conferred with Adj. Gen.

William H. Jones, at Frankfort, following completion of the inspection tour.

E. SAYRE COURTNEY, member of the Lexington Board of Commerce Airport Committee, recently announced that the committee had looked over several sites with the plan of establishing a municipal airport in Lexington. Plans for financing the arrangement have not been worked out.

WILLIAM E. SMITH, president of the Standard Oil Company of Kentucky, at Louisville, and operating in Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida, has announced a plan under which airway markings will appear on company bulk plants, and refineries throughout the states named. The route from Louisville to Lexington will be marked on roofs at Shelbyville, Frankfort, Lawrenceburg, Lexington and Versailles. The Louisville-Cincinnati route will be marked by roofs in the cities of Lagrange, Campbellsburg, Carrollton, Sparta, Williamstown, Erlanger and Covington, Ky. As such markings will be scattered over six states, there is bound to be improvement in air routings shown. There are several existing buildings, now available, which are considered for the purpose.

## TENNESSEE

[VIRGINIA MATTHEWS]

MOONLIGHT excursions along the Chicago-Atlanta air route are being planned by the Interstate Airlines, Inc., it was recently announced. The first of the night flights will be from Evansville, Ind., headquarters of the company, and Sky Harbor near Murfreesboro, Tenn., will be included later. The flights will be made over the air mail route, and safety will be insured by lighting all along the way. The lighting system is now being installed and is expected to reach completion in September.

LIGHT blue uniforms bearing the insignia of the company, with silver buckles and buttons and silver sleeve stripes showing rank and service, will mark the pilots of the air mail planes along Interstate lines, according to announcement of Col. W. G. Schaffner, Interstate Airlines vice president and general manager. The new uniforms are soon to be put into service.

TENNESSEE'S Sky Harbor, 23 miles from Nashville, is to be ready for air travelers in October, according to its builders, Interstate Airlines, Inc. The administration building at the new airport offers a lounge room, dining hall, sleeping quarters, cafe, rest rooms, showers, and a roof garden for dancing and dinner parties. A hangar, 100 by 120 feet in dimension, has 24-foot lean-tos at either side for flying school class rooms and shops. Showers, stock rooms and office space for the hangar personnel also have been provided. The entire airport contains 188 acres.

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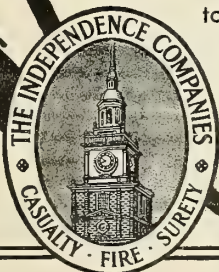
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(Tennessee News continued)

**CHATTANOOGA**

[JAMES S. LINDSEY]

**S**OUTHERN FLYERS, INC., a newly organized Chattanooga concern, completed its formation recently with Tarbell Patten as president, R. P. Frierson as vice-president and R. H. Hart, Jr., as secretary and treasurer. The new company is capitalized at \$50,000, and is authorized to sell and service airplanes, instruct students, and carry passengers for hire. Having leased the Brainerd Airport, the company is erecting hangars to accommodate ten planes. Its equipment now includes a Stinson 5 passenger cabin plane, a Travel Air training plane, and one Waco demonstrator. Southern Flyers have the Waco agency for northern Georgia, northern Alabama, and central and eastern Tennessee. Jersey Ringel is field manager and chief pilot. Eight students are now enrolled in the company's school and members of the company are working to organize private flying clubs.

**T**HAT more than 60,000 pounds of airmail has been carried between Evansville, Ind., and St. Louis, Chicago and Atlanta since Jan. 2, was announced recently at the Chattanooga office of the Interstate Airlines, Inc. Interstate planes carried 25,428 pounds of airmail over the Atlanta Chicago route, an average of 1,540 miles per day, during the months of May, June, and July. The company announced that it has carried 58,865 pounds of mail during the first six months of the year.

**TEXAS**

[CAPT. W. H. SCOTT]

**A**N air caravan consisting of 25 planes and over 100 citizens of Fort Worth visited 20 towns in Texas during September for the purpose of fostering interest in aeronautics. The tour was led by Hub Diggs, chairman of the Aviation Committee of the Fort Worth Association of Commerce; R. E. Harding, president, and Tom Hardin, vice-president, of the Texas Air Transport. The route was drawn up by D. W. Carlton and the towns visited were Waco, Corsicana, Houston, Galveston, Corpus Christi, Victoria, McAllen, Harlingen, Brownsville, Laredo and other points in the Rio Grande Valley. The party also made two trips into Mexico.

**Airport Development in the Rio Grande Valley**

By Capt. W. H. Scott

**A** SURVEY of aviation activities in the Rio Grande Valley of Texas now shows the leading cities with an airport each, and engaged in rivalry for leadership. Harlingen claims the lead as a large flying school has been recently established in that city. Several planes are kept in continuous operation and a large class of students has been enrolled for fall training in Harlingen's school. McAllen and San Benito are the

other towns in this region encouraging aviation interest.

H. F. Rogers, chairman of the aviation committee of the Harlingen Chamber of Commerce, and Claude Carter, are the leading workers in the development of the local airport which includes a flat plot of land extending 222 acres, of which 172 acres is used for the field. Other parts are set aside for a golf course, and children's playground. Runways into the prevailing winds are 2,600 and 3,000 feet long and are constructed according to Department of Commerce regulations. The field is owned by the city and Ben Talbert is manager. Operations have been formerly conducted by the Valley Airways and the Valley Aero Company. They are planning large extensions in the near future. The field has one hangar and all facilities for operations on a large scale.

At McAllen, D. W. Webber, chairman of the aviation committee of the McAllen Chamber of Commerce, has obtained a new field of 150 acres from the La Lomita Irrigation and Construction Company which will be developed immediately as an airport and put into shape to comply with Government requirements. The land is located one mile west and one mile north of the city. It borders on a paved road. The City of McAllen will buy the port outright, and a flying service and training school will be located there. The new field is on the direct route to Mexico City, and by following the direct line from McAllen, fliers avoid mountain fogs and the necessity of flying over the high Mexican mountains. With the purchase of the new field the old field of forty acres that has been in use for several years will be discontinued, or used as an emergency field.

Members of the Board of Development at San Benito decided at a special meeting held recently to purchase a plot of land of from 120 acres to 160 acres in extent and lease it to the Government as an intermediate landing field. Arrangements for the purchase of the land were placed in the hands of L. L. Zenor. The commission also authorized Mayor J. Scott Brown to close the contract for the purchase of the land when the plot has been finally decided upon. The Government will erect landing lights, floodlights and a beacon at the field.

**DALLAS**

[RUBY THOMPSON]

**D**ALLAS' third flying school will begin operation in the next 30 days, according to announcement made by Capt. W. F. Long, newly appointed director of the Curtiss Flying School, which is to be established on a 274-acre tract of land 10 miles west of Dallas. The field was recently purchased by the Curtiss Flying Service. Work has been started on a concrete and brick hangar and an administration building, both to cost \$100,000. Stone and Webster are contractors in charge of the construction. The hangar will be 12 by 100 feet, and, together with the administration building, will be located in the northern corner of the field.

Curtiss-Fledgling and Curtiss-Robin planes will be used for training, and a local sales office of the Curtiss Flying Service will be maintained at the new school. Display rooms and a sales office will also be retained at Love Field, with W. A. (Tex) Bohannon, in charge of the sales division.

Two other schools are now in operation at Dallas, the Dallas Aviation school, and the Texas Air Transport Flying School. The Dallas Aviation school, which Capt. Long founded at Love Field two years ago, will continue independently at Love Field under the ownership of a group of Dallas business men. The school will remain under the management of C. E. Harman.

**T**HIRTY minutes additional time in the morning has been afforded air mail users in Dallas by a change in the departure of the National Air Transport plane, the plane carrying mail for the northern and eastern points leaving Love Field at 9:30 a. m. with a closing time of 8:55 a. m. at the Post Office.

The heaviest poundage for any one month since the National Air Transport, Inc., started operations was carried out of Dallas in July, totaling 3,351 pounds for July, 1929, as compared with 1,258 pounds for July, 1928.

[RORIE E. COWDEN]

**C**HAS. H. BLOSSER is in charge of the factory branch of the American Eagle Aircraft Corporation which has been established at Love Field. E. E. Porterfield, president of the American Eagle Aircraft Corporation, flew to Dallas to sponsor the opening of the factory branch. A banquet honoring the visitors was held at the Adolphus hotel and attended by 200 flyers and city officials. It is planned to keep a complete line of planes, parts and accessories at the Dallas branch. The planes will be on display at hangar No. 6, which has been leased from Capt. W. F. Long. The branch will also have facilities for servicing planes in the territory.

**T**HE Southwest Air Fast Express Company has inaugurated an aero-car service from down town hotels in Dallas to Love Field for the convenience of passengers en route to St. Louis, Kansas City and intermediate points.

**C**APT. LELAND CRAWFORD, aeronautical engineer of the U. S. Army Air Corps, E. M. Belk and L. H. Earnest, city engineers, and Lt. Harry Weddington, in charge of army activities at Love Field, have completed the plans for the expenditure of \$1,000,000 on an improvement project for Hensley Field, Dallas' new airport, which has been leased to the Army. The graveled runways have been completed, a clubhouse has been erected and other improvements are well under way. A large steel hangar will be erected on the field as soon as possible. The fourth and last class of the reserve officers' training camp is being held at Hensley Field, and all army

(Continued on next page)



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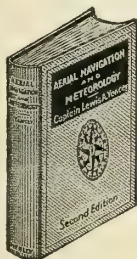
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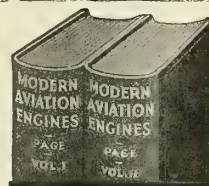
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(Texas News continued)

activities in Dallas will be transferred to the new field as soon as the hangars are completed.

[CAPT. W. H. SCOTT]

LIEUT. HARRY WEDDINGTON, commanding officer of the 366 Reserve Squadron, will continue the Army Training School at Love field. Classes of over 250 officers have been given instruction during the summer.

THE new army air corps training field at Grand Prairie was opened recently with a display of flying by hundreds of planes. Squadrons of planes came from San Antonio, Tulsa and Fort Worth. The field was opened by J. Waddy Tate, mayor of Dallas and officials of the last city administration. Lieut. Arthur Reinhart, who was responsible for the purchase of the field, was given a place of honor during the ceremonies.

TEXAS AIR TRANSPORT has opened a new hangar at Love field where students are taught rigging and fuselage building. Other departments deal with all kinds of aeronautical engineering for modern aircraft.

THE erection of a hangar by the Dallas Chamber of Commerce will proceed immediately, according to Major Robert Laird, secretary of the Aviation Department. The hangar which was subscribed for by leading citizens in the city will be one of the largest in the south. This will give Love field 15 hangars.

## SAN ANTONIO

[GENE SMITH]

THE 12th Observation Squadron and the First Photo Section, Dodd Field, Texas, reported to Port Lavaca on the Texas coast for their annual bombing and machine gun practice during the entire month of September.

THIRTY new type training planes have been ordered for Brooks and Kelly Fields for delivery in December, January, and February. This new type, O-32, is similar to the present type, the O-2-K, used for basic training, except that it will be powered by a Pratt and Whitney radial air-cooled engine instead of a Liberty. The new ships will be divided equally between the Primary and the Advanced Flying Schools. This type was selected by a board of officers in conference at Wright Field.

At this meeting it was decided to ask manufacturers to submit types of light commercial planes to take the place of the PT-3, used in instructing beginners. The new type selected will be lighter and will be powered by a smaller motor. The ships will be tested out at the two schools before one is selected.

BIG SPRING, Texas, opened its new municipal airport with a two-day celebration in September. Kelly Field was represented at the celebration by ten planes.

The new airport is equipped with two steel hangars, a machine shop, a five-room administration building, border lights, flood lights, and beacon lights.

TEXAS AIR TRANSPORT FLYING SERVICE, Inc., recently announced that two airplanes will leave on each departure on its airline schedule Friday, Saturday, and Sunday, to take care of the increased business between Dallas and Brownsville and Dallas and El Paso. The company has acquired the use of an additional hangar at Winburn Field, San Antonio, by subleasing it from the Mission Airplane Service.

BIDS for the first unit of construction at Randolph Field, the new Army Air Corps flying field near San Antonio, are now receiving the consideration of the quartermaster general's department and the chief of the Air Corps in Washington. The low bid on this first unit was approximately \$3,250,000. More than 250 members of the building industry were present when bids were opened at the field by Capt. A. W. Parker, construction quartermaster.

The first unit of construction includes five barracks to house 250 men, one barrack to accommodate 300 men, 10 field officers' quarters, 60 company officers' quarters, 47 non-commissioned officers' quarters, one quartermaster warehouse, and one air corps warehouse. When completed this unit will be only a small section of the field. Utilities and streets have practically been completed in anticipation of actual construction work.

## OKLAHOMA

[CRENIA SANDLER]

CHARLES HAINS HOPKINS, director of information service of the Oklahoma State Chamber of Commerce, has resigned to accept the position of personal representative of Major W. B. Robertson, St. Louis aircraft manufacturer.

A 4,000-foot concrete taxi strip will be added to the Tulsa municipal airport. Contracts specify that the strip must be slightly in excess of 4,000 feet in length, and 36 feet wide. An apron 100 feet by 100 feet is to be placed before the municipal hangar.

THE Spartan Aircraft company appointed S. L. Willits, formerly assistant chief of the inspection section, Bureau of Aeronautics, Department of Commerce, vice president of the company. Willits will take over the executive management of the Spartan School of Aeronautics in its expansion program.

PLANS have been announced for the establishment of a municipal airport three miles east of Stillwater. Options have been obtained on section 16 of the school land at a purchase price of \$13,700. Plans are in course of development for the erection of hangars the first of the year. The plans will be formed in collaboration with the engineering school of the Oklahoma A. and M. College, which will install a school of

aeronautics at the state college in September. The aviation courses are being planned by Dean Phillips Donnell of the engineering school. Equipment for the course is to be installed this summer.

THE Garland Aircraft Corporation of Tulsa recently closed a contract with the Bellanca Aircraft Corporation of New Castle, Del., for the distributorship of Bellanca planes over eastern Kansas, Oklahoma, Texas, Arkansas, Mississippi, Louisiana, New Mexico and Mexico.

The Garland School of Aeronautics has ordered a supply of parachutes to be used in all training at its field at Tulsa and at the branch school of Amarillo, Texas. The school now has three Fleet training planes in operation as well as a Curtiss Fledgling, Curtiss Robin, Stearman, Bellanca and Command-Aire. Night flying, cross-country flying, and instrument flying, as well as a course in aerobatics, is taught at this institution.

## KANSAS

THIRTEEN central Kansas cities and towns will have direct connections with aerial transportation to Kansas City, Topeka, Oklahoma City and Tulsa under plans recently worked out by the central division of Universal Airlines, Arkansas Valley Interurban Railway, and the Cardinal Stage lines in Kansas. The bus and interurban firms have arranged feeder lines to Wichita from Salina, Assaria, Bridgeport, Lindsborg, McPherson, Moundridge, Hesston, Newton, Hutchinson, Barton, Halstead, Sedgwick and Valley Center. Arrival times have been arranged to permit passengers to make connections with planes.

TOPEKA has been added to the Universal Airline schedule, ships from Kansas City stopping there at 9:40 A. M. and 3:50 P. M., and northbound craft stopping at 10:50 A. M. to 5:50 P. M.

## WICHITA

[E. W. PRYOR]

THE Department of Commerce has issued approved type certificates for two Travel Air seaplane models. They are the Wright Whirlwind 300 horsepower cabin monoplane, and the Wasp-powered monoplane, according to Ralph Nordberg, Travel Air executive.

JACK RUSSELL won the silver cup offered by the *Wichita Eagle* recently for the longest endurance flight in a model meet sponsored by the Wichita chapter of the A. M. L. A. His plane flew more than five minutes, setting a new official record for Kansas model planes. More than 100 boys attended the meet.

WHEN the new dormitory of the Braley School of Flying at Wichita was dedicated recently a charge of \$1 a person was made for flights, and more than 500 persons took advantage of the offer during the afternoon. The new dormitory is modern in every respect, with quarters for more than

(Continued on next page)

# DALLAS AVIATION SCHOOL, DALLAS, TEXAS

## OUR PRICES Why Pay More?

Primary course, 10 hours flying instruction and practical ground work, **\$180.**

Advanced course, 15 hours flying, dual and solo instruction, ground instruction, **\$295.**

Private Pilots' course, 20 hours flying, ground instruction, qualifies for Private Pilot's license, **\$385.**

Commercial course, 50 hours flying, including ground instruction, cross country flights, aerobatics, **\$795.**

Transport course, everything in flying required for transport license, **\$2,500.**

Ground course, 5 months' training in shop and ground work, **\$100.**

Classes in instruction in air navigation and meteorology, motors and ignition included with all courses.

*All year flying. We fly every day. No off seasons. No winter weather. Ideal conditions.*

## COMPLETE COURSES • • • • • IN AVIATION

**Where it is easy to learn to fly; less time; lowest prices.**

**W**E require no bond of our students. You can start flying the day you arrive. Individual instruction for each student. New licensed equipment, licensed instructors. Safe and sane flying always. ☐ Dallas has over 500,000 population. Our capital stock is \$200,000. Board and room may be secured on the field at from \$8 to \$10 per week. We own and control 60,000 square feet of hangar and shop space. ☐ Get started for your place in aviation now. *Win your wings* in Texas, where you save time, money and expense and where everything is in your favor. ☐ Railroad fare free from any point in U. S. to Dallas if you enroll for commercial or transport course. ☐ Our airport, "Love Field," is electric lighted.

### REFERENCES

Dallas Chamber of  
Commerce.  
Mercantile Bank  
and Trust Co.

Has gas, water and sewerage systems. Two mail deliveries each day, four air mail lines, five air passenger lines, bus service to Dallas 18 hours each day, telegraph office on field, paved roads in all directions, four miles from Dallas. Finest landing field in whole country. More than 2½ million dollars invested at Love Field. ☐ Our students come from every state in the Union and our enrollment is larger than any school in the South. We have been in business more than 10 years. Our students flew 8,000 air hours last year without a single accident. ☐ *New auxiliary field.* On or about September 15 we will add another field of over 300 acres for student flying. ☐ *Wire us at our expense* the time of your arrival and we will meet you at the train here.

WRITE US  
FOR  
OUR CATALOG  
AND FULL  
INFORMATION

# DALLAS AVIATION SCHOOL

**Love Field, Dallas, Texas**



(Kansas News continued)

100 students and visiting pilots. A cafeteria in the basement is patronized not only by Braley students and employees, but by employees in several plane factories within a radius of three or four miles of the school's field.

**T**HE first plane of the Sullivan Aircraft Company, a low-wing cabin monoplane, was recently test-hopped by Romer Weyant, officer and test pilot of the company. The plane, a three-place job designed by W. P. Sullivan, performed well, according to Weyant and other pilots who took it up. The plane is powered with a Kinner motor, and has a top speed of 125 miles an hour, a cruising speed of 105 miles, a stalling speed of 50 miles, and landing speed of 35 or 40 miles. Two more planes of similar design are under construction.

**T**HE Kinner Motor Company is establishing a parts and service base in Wichita, according to Robert Porter, president of the firm. Many Kinner engines are being used in Wichita-made planes and the service base here will care for the servicing of these engines.

**T**HE Swallow Airplane Company of Wichita recently announced a new sales plan to take effect immediately. Through hook-ups with more than 100 flying schools throughout the United States, every purchaser of a Swallow plane will be taught to fly in his own ship, according to W. C. Vail, Swallow executive. These schools

are so distributed that no plane purchaser will be far from an instruction point.

**W**ATKINS Aircraft Corporation and Simmons Aircraft division of Steel, Inc., Los Angeles exporters, have signed a contract for the delivery, for export, of 330 Skylark low wing monoplanes within the next five years. The Skylark is a low-wing, two-seated sport plane, powered with a LeBlonde 60-horsepower engine. It was designed by Chester Cummings. Delivery of the first planes under the contract is expected about January 1, according to E. A. Watkins, vice-president of the company.

**D.** M. CAMPBELL, formerly manager of the Universal School of Rochester, N. Y., has been transferred to Universal Aviation School in Wichita, where he will be principal of the ground school. He was an ensign in the naval flying corps, and is a naval reserve flier.

**D**AYLIGHT air mail service which will bring Wichita 24 hours nearer cities east of Chicago, is planned by Wichita air mail officials. Three N. A. T. officials, L. D. Seymour, general manager, E. P. Lott, operations manager, and R. W. Ireland, commercial manager, recently conferred with postal officials, chamber of commerce officials, and others interested in improved service, and ordered a survey to determine how the new service would be patronized. Interested Wichita business men are confident the survey will show the need of such

a service, and that it will be granted. The line would go into operation on a 90-day trial basis.

**T**HE biggest and fastest plane of the Cessna Aircraft Company at Wichita has been delivered to Colonel Art Goebel, winner of the Dole flight. It is a cantilever-wing monoplane, powered with a Wasp engine, and has a high speed of 180 to 200 miles an hour.

**A**IR taxi service to any point in North America at the rate of 10 cents a mile will be provided by the Yellow Air-Cab Company when it opens its first station in Wichita, according to G. E. Prebensen, president. It is the intention of the company to establish Yellow Air-Cab stations in all large cities of the country. Stations will be established as rapidly as is practicable. Service, rates and accommodations in every station will be alike. Originally planned as an air transport business, Yellow Air-Cab Company will also operate as an aircraft distribution organization.

**T**HE Wichita School of Flying, with four years of successful operation to its credit, has moved into new quarters on the municipal airport, occupying the municipal hangar until its own \$40,000 hangar and office building is ready for use. The school, started by Charles Lander, has graduated more than 500 pilots without an accident of any nature. It operates six planes, three Travel Air training planes, a Swallow TP, a Stearman, and a Travel Air.



Largest and Smallest Edo Floats

### EDO EQUIPPED

(List revised to August 15th, 1929)

AEROMARINE-KLEMM  
ALEXANDER EAGLE ROCK  
AMERICAN EAGLE  
AVROE AVIAN  
BELLANCA-CH-300  
BUHL CA-6  
COMMANDAIRE 3C-3A  
COMMANDAIRE 5-C-3  
CURTISS ROBIN  
FAIRCHILD 21  
FLEET  
FOKKER UNIVERSAL  
FOKKER SUPER-UNIVERSAL  
HESS  
KEYSTONE PRONTO  
KEYSTONE PUFFER  
LOCKHEED VEGA  
LOCKHEED AIR EXPRESS  
MOHAWK PINTO  
MOTH  
MONOCOUE  
NEW STANDARD  
RYAN B-1  
RYAN B-5  
STANDARD  
STEARMAN C-3-B  
SWALLOW  
STINSON SM-1F  
TRAVEL AIR 2000  
TRAVEL AIR SB-4000  
TRAVEL AIR SC-4000  
TRAVEL AIR SA-6000  
TRAVEL AIR SB-6000  
WACO 9  
WACO 10

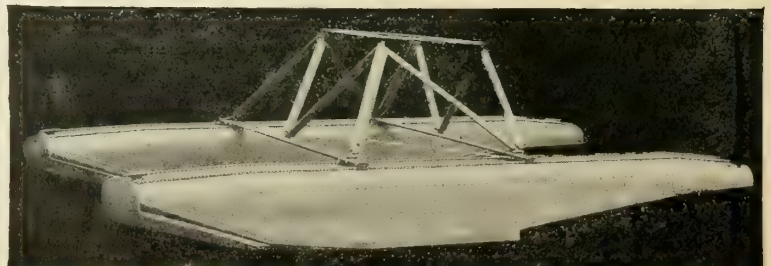
15 of the above ships have been licensed by the U. S. Dept. of Commerce as Edo-equipped seaplanes.

## A Complete Float Installation for your airplane

Edo has equipped more types of present production airplanes with Floats than all other American manufacturers combined. This wealth of experience enables the makers to build floats of outstanding aerodynamic, planing and seaworthy characteristics, standardized in a complete series of eight distinct types adapted to all classes of land planes up to 5100 lbs., gross load. Complete Edo Float installations, interchangeable with wheel landing gear, can be purchased direct from the leading airplane manufacturers. For prices and further particulars, address Edo Aircraft Corporation, 610 Second Street, College Point, Long Island, N.Y.

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THE FLOAT MAKERS

Edo Standardized All-Metal Float Installation



Say you saw it in AERO DIGEST



Another great passenger and express airline chooses Allmetal Flamingo transports. Pictured is part of the Flamingo fleet being built for the Great Southern Airways, to connect Los Angeles and the East.

# 30 cents a Ton Mile ~ ~ ~ 3 cents a Passenger Mile

..... these low operating costs are arrived at after thousands of miles of operation. The Allmetal Flamingo cabin transport accommodates seven passengers and pilot, plus 500 pounds of mail or express; has 4 to 5 hours fuel range; high speed of 140 m.p.h. with a Hornet or Cyclone; 132 m.p.h. with a Wasp. Write for information on the exclusive features and detailed operating cost data. Demonstration flights in United States or Canada. Seaplane floats available. Equipment loans negotiated.

ALLMETAL  FLAMINGO  
METAL AIRCRAFT CORPORATION OF CINCINNATI





The Whirlwind-powered Travel Air monoplane, capable of a speed of over 200 m.p.h.

## NORTH DAKOTA

[A. E. RIGGLE]

ACTIVE enforcement of the state law governing the operation of airmen and aircraft doing business for hire within North Dakota will begin shortly, according to a statement by the state railroad board. A recent order of the board adopted the same rules and regulations for application to North Dakota that are applied by the Federal Department of Commerce to interstate fliers.

DEDICATION of the Williston, N. D., airport took place September 24 and 25, a small fair being staged on the field to celebrate the event. The Canfield Flying Service, of which E. M. Canfield is head, provided three ships for passenger hopping and exhibition flying at the event. Fair exhibits were housed in the hangar of the company.

DAILY, except Sunday, airplane service was started between Minot and Bismarck September 17 by the International Airways of Minot, of which Cecil Shupe is chief pilot. A Ryan Brougham, with a capacity of four passengers, besides the pilot, is being used on the run. In event additional facilities are needed a Lockheed Vega cabin plane will be pressed into service. The plane leaves Minot each day at 10:30 A. M., arriving at Bismarck at 11:45 A. M., and leaves Bismarck at 1:15 P. M., arriving in Minot at 2:30 P. M.

### Automatic Time Switch Operates Field Lights

THE Sauter Time Switch, an electric method of turning field lights on and off, has been placed on the market through the firm of R. W. Cramer, Inc., New York City. The device eliminates the human element to the extent of doing away with the weekly setting and hand winding of time

clocks, and can be equipped for a variety of schedules, such as full-night, half-night, Sunday off, on-and-off at certain hours, etc.

## MISSOURI

THE California Propeller Company, formerly located at Los Angeles, has opened a factory in Marshall, Mo., and is manufacturing a complete line of propellers for all type engines. The company manufactures the California propeller which is made of imported Japanese birch, noted for its extreme hardness and resistance to moisture. This wood is light in weight and has an unusually straight grain, according to the manufacturers. The Nicholas-Beazley Airplane Company, Inc., will act as distributors for all models of the propellers.

A FRONT control stick, which is quickly detachable and which can be as quickly installed, is a new feature on the Barling NB-3 monoplane manufactured by the Nicholas-Beazley Airplane Co., Inc., of Marshall, Mo. The new control was designed to permit the plane being converted readily into either a passenger carrying or student training plane.

The Barling NB-3 monoplanes equipped with either a Genet 80-horsepower engine, or a Velie motor of 65 horsepower, will be available shortly in addition to the stock model equipped with the LeBlond Sixty, it has been announced by Nicholas-Beazley officials. Production of the three models

(Continued on next page)

# "PRE-HEAT WITH THERMO-PETE"

BY using a Thermo-Pete you will find that you can cut down useless revolutions of your engine—getting the same results.

The cost of operating Thermo-Pete for twenty minutes is ONE CENT—How much does it cost you to operate your engine for twenty minutes

"Thermo-Pete" (best friend to motor and pilot) when connected with the ordinary 110-volt lighting circuit, quietly, quickly and inexpensively heats the oil (without injury) to the desired take-off temperature, ready for "Contact" and "Twist the Stick" and "She's Away!"

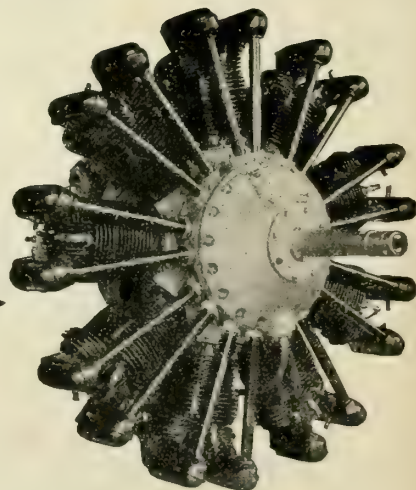
Approved by National Board of Fire Underwriters and many other authorities, "Thermo-Pete" is today's scientific answer to the need for saving Dollars, Pilot's Time, Motor Depreciation, Schedule Hours and Hangar Labor.

Use coupon and let us airmail you complete details of the help "Thermo-Pete" will be to the motor of YOUR ship.

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### AVIATION ACCESSORIES CORPORATION

Moline, Illinois

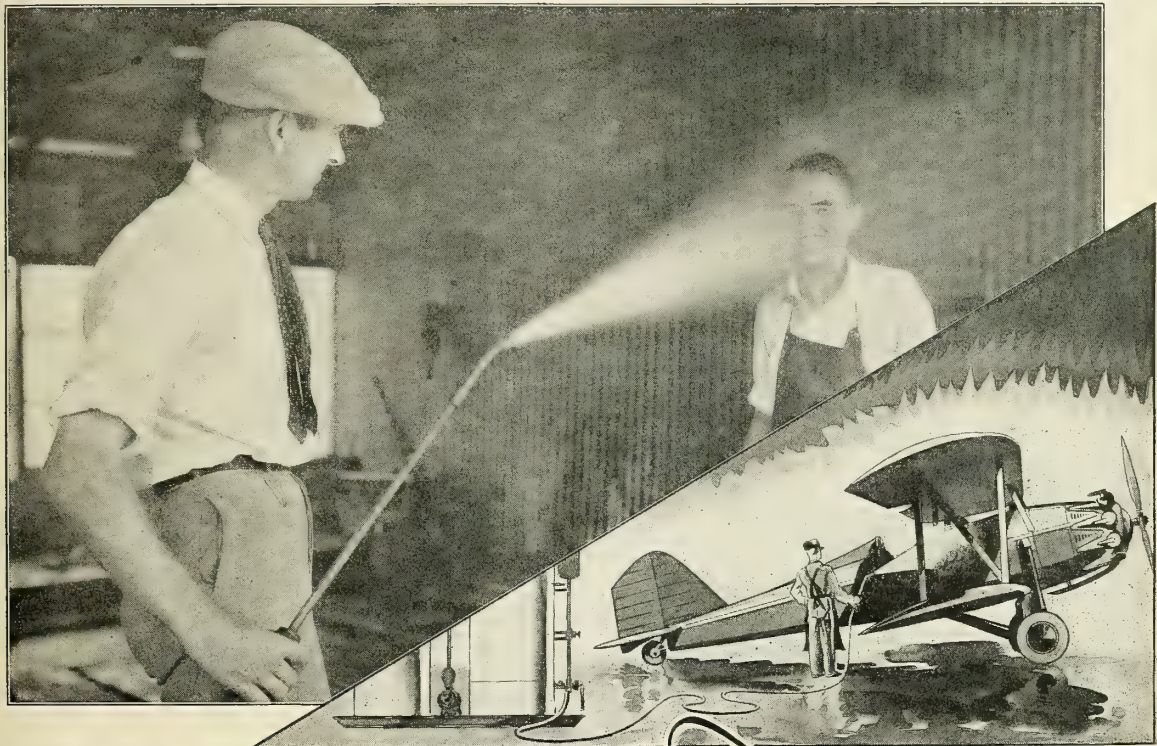
I am flying a ..... ship  
with ..... motor,  
whose oil tank is made of .....  
holds ..... gals, and is shaped like the  
rough sketch I've drawn in the margin.  
Tell me more about "Thermo-Pete." (AD 10-29)  
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And at a Glance You Can See the  
Tremendous Saving in Operating  
for the Warming Up Period

It has been proved that THERMO-PETE has saved  
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**HARMLESS TO HUMAN SKIN.....**  
**DEADLY TO GREASE AND DIRT...**



**TRIDEX** *For Airplane Cleaning*

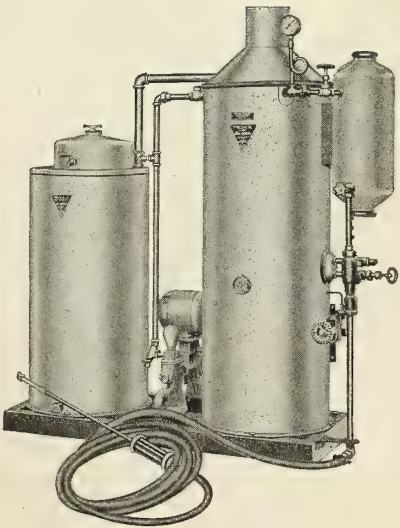
The photograph above shows the famous TRIDEX atomized spray being directed squarely into the face of a man whose expression is a testimonial to the fact that the experiment is both harmless and painless. For the TRIDEX spray has been so scientifically developed that it employs neither great hydraulic force nor strong chemicals to accomplish its thorough cleaning jobs.

Yet the same spray, turned from the man's face to a muddy landing gear, a spattered fuselage or a grease-coated motor would instantly loosen and quickly wash away mud, dirt, grease and discolorations and thoroughly clean the plane from prop to tail in fifty minutes.

TRIDEX established a lasting reputation as a Cleaning Unit in the automobile field and now the new TRIDEX Model G has been developed with particular attention to the needs

of airports and airline operators in keeping equipment clean and attractive. Airplane owners and operators (names on request) have found TRIDEX invaluable for keeping flying equipment glistening clean and in increasing the efficiency of air-cooled motors by periodic cleanings of the cooling fins with TRIDEX.

TRIDEX offers, at last, the scientific, correct way to clean motors, fuselage and under gears. The machine first chemically softens the water, then produces a fine spray of warm, soapy water. The warmth opens the pores in dirt and grease, the soap enters and dissolves the mass, and the spray washes it away. Hardened accumulations of grease and dirt in inaccessible pockets of motor and cowlings melt and disappear as if by magic, leaving all surfaces really clean. The Tridex spray is also ideal for cleaning parts on which work is to be done, and for removing greases and oil from walls and floors.



**MAIL THIS COUPON**

THE GUIBERSON CORPORATION, Dept. A.,  
Box 1106, Dallas, Texas.  
Gentlemen: Please mail me without obligation, full information and prices on your Tridex Cleaning Unit.  
Name \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_  
R. R. Safford Company, Exclusive Southwestern Distributors, P.O. Box 931, Dallas, Texas



*(Missouri News continued)*

will begin shortly and production will be increased to a total of ten planes per week. A new feature in the production system is a standard motor mount, which accommodates all three engines.

Nicholas-Beazley officials announce the appointment of the German Brothers, Aircraft Division of Pennant Industries of Brooklyn, New York, as distributors for the Barling NB-3 monoplane. The Dawson-Babcock Aircraft Corporation of Pittsburgh, Pennsylvania, has been appointed distributors in Pennsylvania and eastern Ohio for the Barling monoplane.

A NEW \$40,000 covering and dope plant has been completed and is now in operation at the factory of the Nicholas-Beazley Airplane Company, Inc., of Marshall, Mo. The new structure is a fireproof structure of brick and steel, 50 by 150 feet. The building is designed to be explosion proof, having a concrete reinforced roof and explosion windows, which are of plate glass hinged at the top with metal hinges.

Modern equipment and labor saving devices are used. Special stands are in service which enable tail surface and ailerons to be doped on both sides at the same time. The building is equipped with four pent houses having exhaust fans which effect a complete change of air every thirty seconds. One pent house with four fans and four coil radiators forces air into the building. The incoming air is heated to a temperature of

90 degrees and dried to the correct moisture content. The building is divided into two departments, one devoted to the covering and upholstering and the other to the doping processes.

The Nicholas-Beazley Company announces the appointment of Jeff Warren of Los Angeles, Cal., as distributor in Arizona and Southern California for the Barling NB-3 Monoplane. A contract calling for forty-six planes was placed by the California distributor.

**KANSAS CITY**

[H. H. JAMES]

A NEW factory building is to be erected by the Kansas City Aircraft Company at Fairfax Airport. The building, which will be 300 feet by 100 feet, will mark the extension of airport activities to a new tract lying west of the present building sites.

The Kansas City Aircraft Company is an association of business and professional men living in Kansas City. The company will build an approved type monoplane on a commercial basis. The factory will cost about \$130,000. The building will include offices, sales and display rooms as well as the factory proper. Manufacturing of the monoplane is going forward in a temporary factory in North Kansas City.

THE Superior Aircraft Corporation has been organized at Kansas City for the purpose of building a new type monoplane designed by Leo Mohme, an aeronautical

engineer. The company has taken a lease on a large factory where the first ship is under construction. As soon as the government license is obtained commercial production will be started.

Directors of the new organization include Mr. Mohme, J. W. Kennedy, Harry Smedley, J. B. Lowery and W. D. Patterson. The first ship to be built is a cabin monoplane. The ship will be powered with a Warner-Schrab motor of 110 horsepower. The production ship will be a four place cabin monoplane, dual control type. Extra gas tanks may be installed to give the plane a 160-gallon supply of gasoline.

LOYD LANCASTER has been appointed production manager for the Wallace Aircraft Co., Inc., a division of American Eagle, which produces the Wallace Touroplane, a folding wing cabin monoplane. Mr. Lancaster assumed charge of production when the Wallace factory was moved to Kansas City from Chicago.

THE first of the primary gliders manufactured by the Cook Glider and Soarplane Company of Kansas City is complete and going through its official test, according to Clarence N. Cook, president of the company. The glider is the second model made by the company and is designed for elementary flight.

The new glider has a 35-foot wing span with a 5 foot chord, giving a total of 175  
(Continued on next page)

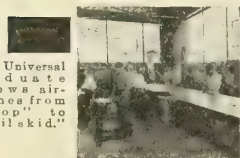
# Learn AVIATION *The One and Only Right Way*



Your plane is Gov't licensed. Your instructor is a transport pilot.



The Universal student gets practical work on modern type motors.



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## Practical Experience Is All That Counts

To learn flying, you must actually fly. To learn aviation mechanics, you must actually work on planes and motors. In Universal Aviation Schools you get the practical training that counts as well as the theoretical instruction. Universal flight and ground courses are probably the strictest in the country. But they teach you what you need to know.

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When you complete a Universal flying, mechanic's or welding course, you are immediately placed in a position to put yourself on a money-making basis. Universal graduates are making good on highly paid jobs all over the United States. Their thorough training prepared them to grasp big opportunities when offered.

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Year around training is available in Universal Aviation Schools. By starting your training at once you may become a full-fledged licensed pilot in the Spring. Or by beginning your ground school training now you may be ready to step into other branches of this fast growing industry early in the year. Take the first step toward getting into aviation by mailing the coupon below.

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*Gov't rating applied for by all Universal Flying Schools*



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Please send me at once your free book, "Aviation—What It Means To You." I am interested in:

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N330R92

# New Building to House Consolidated!

Beautiful new building—pictured to the right—will shortly be completed. It will house the various activities of the great National Air Industries, including Consolidated Air College. Think of getting your training in this remarkably modern building situated right on famous Fairfax Airport.



# Aviation Demands TRAINED Men Proper Training Gives you Your Big Chance!



National Air Industries, a large aviation corporation, is supplying its needed ground men, airport managers, factory men and pilots from its own college. Men trained here at Consolidated Air College (a subdivision of National Air Industries, Inc.) have many wonderful openings right here in our own organization.

**I**N aviation big events move swiftly. No time is available to "break in" untrained men. But great are the rewards to the man with **TRAINING!** Prepare yourself to command your own figure in your own particular field. Look forward to years of prosperity and success. Get right into the heart of the fastest growing industry in the world today. Submit no longer to a dull, monotonous, low pay job. You can do this—after you have had training here at Consolidated Air College—recognized as one of the finest training schools in the country.

Here with us, you step right into a fast moving, efficient College of the Air which is already a proven, successful organization. From the minute you enroll you are under personal supervision from beginning to graduation. Man-to-man instruction provides one transport instructor and one new-production licensed plane for each group of ten students in the fifty-hour class.

### YOU FLY IN FINEST EQUIPMENT

The best of equipment is waiting for you to use. American Eagle Biplanes equipped with OX5 and Kinner Motors, Monocoupees, Cessnas powered with Wright J-5's and Siemens-Halske Motors and a Wright J5-Ryan. Recently we have added the famous Great Lakes Training ship. This variety of fine training planes gives the student every advantage. Veteran instructors, who have helped make aviation history, teach you every detail thoroughly.

### GROUND SCHOOL COURSE

Many students prefer to take the ground school course, and then accept a good paying job in aviation for a time before completing the flying courses. Our ground school teaches every phase of aviation including every detail about motors and equipment, construction, installation, rigging, overhauling and "trouble shooting": including navigation, meteorology and a new course in parachute operation.

### KANSAS CITY WELCOMES YOU!

Kansas City, the greatest of air centers, welcomes you. Kansas City will help you in every way to make good. This thriving center of aircraft manufactures and cross-continent air traffic is astir every day with happenings that vitally affect your career. Here at "Consolidated" you are in the swing of Kansas City's air spirit, close to its big downtown district, within easy distance of the flying fields and to home-like living quarters nearby.

# CONSOLIDATED AIR COLLEGE Inc.

Kansas City, Missouri

**GET THE FACTS TODAY**  
Do not hesitate or delay but sign and mail the coupon. Get this extremely valuable information about your future success in aviation, which comes to you absolutely free and post-paid with no obligation on your part. Do it now—today!

### Big Handsome Book FREE!

This wonderful 64-page, lavishly illustrated book is yours for the asking. Contains a wealth of information about aviation. Shows pictures of factories, famous planes and fliers, explains step-by-step how you are taught to fly, etc. Easily worth one dollar—yours free if you are interested.

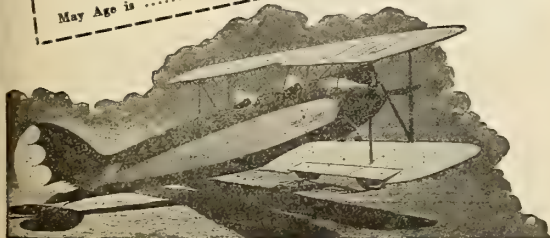


CONSOLIDATED AIR COLLEGE,  
527 Wyandotte Street,  
Kansas City, Missouri.

Please send 64-page illustrated book on aviation and complete information on subjects marked, in which I am especially interested.

- ☐ Time Payment Plan
- ☐ Ground Course
- ☐ Private License Course
- ☐ Limited Commercial Course
- ☐ Transport Course
- ☐ Employment While Training
- ☐ Employment After Graduation

Name .....  
Address .....  
May Age is .....





(Missouri News continued)

square feet of supporting surface in the wing. The struts are of routed spruce with plywood reinforced joints. It has a safety factor of 6.50. Each wing panel is equipped with a ten-foot aileron giving a total of 30 square feet of aileron surface. The wing tips are elliptical. Standard airplane controls are used throughout.

The company has opened a glider school in Kansas City with a curriculum of full aeronautical courses. The work of the school will include a complete mechanics course, (with the exception of internal combustion motor work), wing building, rigging, steel work, including welding, aerodynamics and meteorology. Flying of the company's newly designed primary gliders will be given, with practice at later stages on soarplanes.

THE summer training period of the 327th observation squadron, air corps reserves, started at the Municipal Airport, Kansas City, August 26. Reserve officers were from Missouri, Kansas, Iowa, Nebraska and Arkansas. The six planes regularly in use were increased by two army ships from Ft. Leavenworth and three from Ft. Riley.

HARVEY J. STONEBURNER has been appointed chief engineer for the American Eagle Aircraft Corporation, Fairfax Airport, Kansas City, succeeding Jack E. Foster. Mr. Stoneburner comes to the American Eagle organization from the United States Department of Commerce

where he was connected with the aeronautics division.

AIR SERVICE, INC., a school teaching aircraft welding at Kansas City, has been forced to double its capacity to care for its students' enrollment. The school in the past has had a workroom limited to sixty students. Three experimental airplanes now are being built at the school by students under supervision.

AN International Air Circus, Exposition, and Pilots' Reunion is being held at Fairfax Airport, Kansas City, from September 21 to 29. A schedule of races and stunts and a display of aircraft fills the program of the event sponsored by the Army Air Corps Reserve Officers Association.

## ST. LOUIS

[A. W. LEAGUE]

WORK on the new Curtiss-Steinberg Airport south of East St. Louis, is progressing rapidly, with 150 acres now available for landing purposes and the first hangar under construction. When completed the airport will comprise 510 acres, with runways, surfaced roads, complete lighting equipment, meteorological station, administration building, passenger depot and various hangars and school buildings. To drain the landing field, 50 miles of tile is being laid. Curtiss Flying Service will use the airport for school and aerial taxi purposes jointly with T. A. T., which will operate passenger planes from there instead

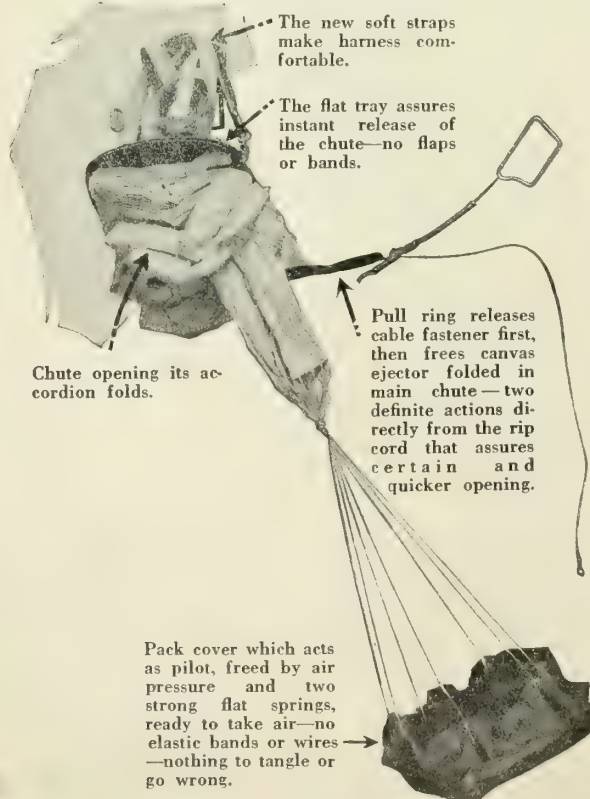
of at Lambert-St. Louis Field. Major C. R. Wassall, former commander of the Thirty-fifth Division Air Service, will be in charge of flying instruction at the field.

## Parks Interests Acquired by Detroit Aircraft Corporation

THE Parks Air College and affiliated companies have been purchased by the Detroit Aircraft Corporation for a consideration in excess of \$1,000,000. The deal involves the air college proper, rated by the Department of Commerce as a transport school, the 100-acre airport and airplane factory, a large brick and steel hangar on the field, a two and one-half story brick dormitory for resident students and nine other buildings used for administration offices, class rooms, repair shops and a restaurant. The Detroit Aircraft Corporation recently obtained control of the Ryan Aircraft Corporation of St. Louis. No change was made in the personnel of the Ryan organization, following the merger, and a similar policy will be followed in the Parks transaction.

A new welding school has been opened by the Parks Air College in Cleveland, Ohio. The St. Louis welding school now has 25 students and Paul Schmolke, welding instructor, has classes both in the afternoon and evenings. Opening of the Cleveland School is part of the Parks program for the organization of seven branch schools in various sections of the country. The welding schools will serve as district offices

(Continued on next page)



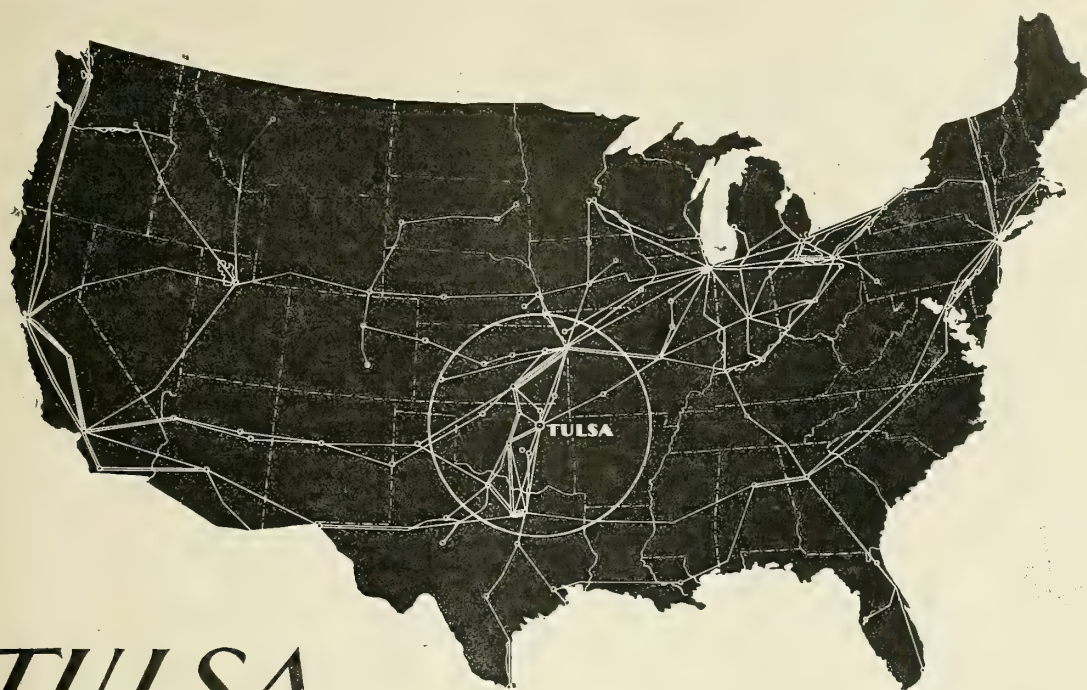
## Quicker Opening—Certain Action—Study this New FLOYD SMITH SAFETY PACK

It is the newest improvement in air safety devices, designed by the originator of the first manually operated pack. The illustration tells the story. Study it carefully and note the simplicity of action—the elimination of all unnecessary flaps and elastic bands . . . of proven quicker opening in Official Lakehurst tests, it is the ultimate in parachutes.

Write for booklet "COMING DOWN." It tells the story of the new pack and also the sensational Floyd Smith Safety Seat.

**Splendid opportunity for live Distributors and Dealers in exclusive territory.**

**Switlik Manufacturing Company**  
Factory: Broad & Dye Sts., Trenton, N. J.



# TULSA....

## -offers exclusive advantages to airplane and accessory manufacturers

*Tulsa* offers to the airplane or aviation accessory manufacturer a combination of advantages not matched by any other city in the United States. Some of these advantages, moreover, are *strictly exclusive*.

To briefly mention the more important ones: A recent survey showed that the oil industry is by far the largest single user of aircraft among American industries. Its use of planes of all sizes is growing by leaps and bounds. Tulsa is the hub of this activity for she lies at the heart of the world's greatest oil section, Oklahoma alone producing one-fifth of the world's petroleum supply. Again, Tulsa lies at the natural crossroads of American East-West and North-South air travel, a statement supported by the map of American air lines and by the fact that since June 1st the Tulsa Municipal Airport has led all other American airports in volume of commercial air travel. Again, Tulsa has become national headquarters for the development and perfecting of airplane fuels and lubricants. Accurately midway between Atlantic and Pacific, she is within one day by air of any point in the United States, Southern Canada and Mexico, yet is far enough south to obtain her ideal year-round flying climate—and finally, to date

she has only two airplane factories and few accessory manufacturers so that the field is as yet uncrowded.

Tulsa business men have organized The Tulsa Industrial Finance Corporation, which assists in the financing of worthy manufacturing enterprises.

It is possible here to touch only a few high spots in the story of Tulsa's advantages. The complete story, vital to the future of the airplane industry, is told in our new industrial survey of Tulsa. Our industrial department will be glad to send you this book without obligation, and is prepared to take a personal interest in your problems, to answer any specific questions and to assemble any special information which you may require. In the keen competition which is ahead in the airplane industry, even small natural advantages which result from scientific site selection will count high. Jot any special questions on your letterhead, attach our coupon, and mail. Your inquiry will be treated in strictest confidence.

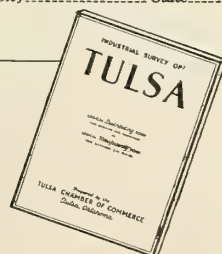
*Send for  
this Book!*

Industrial Commissioner,  
Tulsa Chamber of Commerce,  
Dept. A, Tulsa, Oklahoma.  
Please send me without obligation,  
your new industrial survey of Tulsa.

Name .....

Street .....

City..... State.....



# TULSA

The Nations National  
Air Center





(Missouri News continued)

and enrollment headquarters for the flying schools. Flying schools are to be opened in Texas, Ohio, New Jersey, Massachusetts, California, Wisconsin and Louisiana, each to be near a large center of population.

Ensign Norman Anderson, a naval flyer and former instructor at Great Lakes Naval Training Station, has been named head of the airplane and engine department of the Parks Air College ground school. Lieut. J. F. Fisher, executive officer of the St. Louis Naval Reserve Flying Squadron and head of the Parks ground school, will have charge of the teaching of Air Commerce Law, navigation and meteorology under the new arrangement.

### Third Annual St. Louis Model Meet

A NEW world's record for scale model planes was set at the Third Annual Derby of the Junior Aviation Club of St. Louis, when a model Fairchild cabin monoplane, belonging to Elmer Luecherath, 16 years old, of St. Louis, stayed in the air 47½ seconds, eclipsing the former record by 1½ seconds. More than 472 model airplanes were entered in the derby at the old air mail field in Forest Park by 100 boys who had constructed the planes. The winners in the contest were decided by the actual time they were in the air. One of the outstanding duration flights was made by a plane built by Joseph Ehrhardt, 16-year-old St. Louis boy. His twin pusher model remained in the air for more than 4 minutes and 50 seconds.

### Lambert-St. Louis Airport Activities

OPERATION of concessions whenever practical by the city at the municipally owned Lambert-St. Louis Airport, was favored in a recent decision by members of the city airport commission. The commission was concerned with the ways and means of raising additional revenue to maintain the flying field. At present it derives from rentals and concessions approximately \$2,400 a year, while the cost of operating the field is close to \$36,000 annually. The airport restaurant is to be taken over by the city and will be enlarged and improved. A series of meetings with interests operating at the airport will be called in an effort to work out, for the city, some method of revenue for the airport. The firms of Love-Sultan, Incorporated, and B. Russ Il Shaw and Company, airport engineers, have been employed for a year to supervise the construction of the airport under the \$2,000,000 airport bond issue.

The drainage project at Lambert-St. Louis Field is well under way. Steam shovels are making three ditches, two for sewers and the largest for the diversion of Cold Water Creek, which now crosses the airport. Small feeder sewers lead into the main drain. Graders are leveling the hillside on the southeast border of the airport and spreading the earth over the area to the bank of the present creek, which will be filled.

The concrete apron along the front of the hangars on the west side of the airport has been completed and is now in use. The apron is 1,550 feet long and 200 feet wide. A strip of oil approximately 200 feet wide has

been laid on the field parallel to the apron, making a dustless taxi strip over 400 feet wide. The experimental runway has also been completed and is being used. This runway is 100 feet wide and 1,200 feet long. It is constructed of asphalt, oil, crushed rock, and earth mixed together. If the material used in this experimental runway withstands the rigors of the winter, it is planned to use the material on all of the eight runways laid out by the airport commission.

An ordinance appropriating \$28,000 for another runway, 50 feet wide and 1,500 feet long, to be built at right angles to the present runway, has been approved. O. R. Parks, field manager of Lambert-St. Louis Field and his assistant Al J. Luig, pointed out to the airport commission the necessity for the construction of another runway to facilitate take-offs. A contract for the construction of the runway has been let and it is planned to have it completed within six weeks. The roadway along the north side of the airport is to be repaired.

Despite injunction proceedings pending in the Supreme Court to halt expenditure of the \$10,000,000 bond issue for road building purposes, the St. Louis County court has announced that a contract has been awarded for the paving of Natural Bridge Road leading to Lambert-St. Louis Field. This project is in keeping with the county's agreement to furnish adequate roads to the airport when the city voted bonds to acquire it as a municipal airport. The specifications call for a 20-foot concrete slab 8.6 miles

(Continued on next page)



## Headliners at Cleveland air classic HASKELITE equipped

The Travel Air Mystery Ship; the Waco Trio; the Navy High Hats (Boeing Planes); and other headliners in the Cleveland "Air Classic of the Century" were HASKELITE equipped—a splendid tribute to the outstanding performance of this blood albumen glued plywood in aircraft construction.

### HASKELITE maintains its record

Check the winners at Cleveland and you will know why 17 out of 20 prefer HASKELITE. Write for engineering and other data.

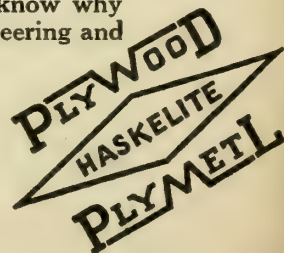
**Haskelite Manufacturing Corporation**  
120 South LaSalle Street Chicago, Illinois

Railway & Power Engineering Corp.  
Ltd., Toronto, Montreal, Winnipeg, New  
Glasgow

Air Associates, Inc.  
Curtiss Field, Box 333, Garden City, L. I.

California Panel & Veneer Co.  
955 S. Alameda Street, Los Angeles,  
Calif.

Cutter Wood & Sanderson Co.  
222 Third St., Cambridge, Mass.



AD-10-Gray

Say you saw it in AERO DIGEST

# INVESTIGATE . . . . . .

## BEFORE ENROLLING



Above—Group of Spartan training planes.



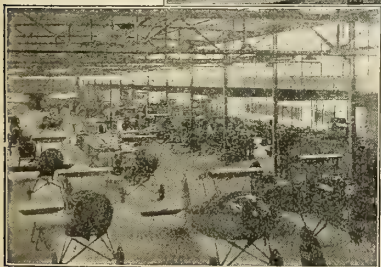
Right—Ford Trimotors at the Tulsa port.



Left—Spartan School students assembling a plane in the laboratory.



Right—Group of buildings comprising the new Spartan School of Aeronautics.



Left—A partial interior view of the Spartan Aircraft Company factory.

WILL YOU RECEIVE FULL VALUE?  
WILL YOU BE TRAINED SCIENTIFICALLY?  
WILL YOU RECEIVE PERSONAL ATTENTION?

Ask yourself these questions. Determine to your complete satisfaction whether they are based upon realities or future plans and hopes.

### BASE YOUR DECISION UPON REALITIES

If you were to invest a sum of money in securities you would naturally satisfy yourself as to the solidity and future of the organization offering them. Apply these same principles to the selection of the school that solicits your investment and you will immediately eliminate the majority of obstacles that stand between you and your future in the aeronautical world.

The Spartan School of Aeronautics has conscientiously endeavored to arrange a course of instruction that will equip its graduates with a thorough understanding of aeronautics, so that their future in commercial aviation will be assured to as great a degree as possible.

All courses have been designed to meet with the approval of the U. S. Department of Commerce. Government inspection and transport rating have been applied for.

**SPARTAN SCHOOL OF AERONAUTICS**  
**TULSA • OKLAHOMA**

FOR COMPLETE INFORMATION USE THE COUPON BELOW

( ) 32-page illustrated school booklet . . .  
 "Training that Produces Natural Pilots."

( ) How I may make use of the Spartan  
 extended tuition payment plan.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_



**NORMAN G. SOUTHER**

New business manager of the Spartan School, will give your inquiry his personal attention.



(Missouri News continued)

long with six-foot asphalt shoulders. County engineers expect to have the road completed within two months.

#### Transport Rating for Universal Schools

THREE Universal Aviation schools have been given transport ratings by the Department of Commerce. The three schools receiving the rating are the Universal school in St. Louis, Porterfield, in Kansas City and Universal in Minneapolis. The other seven schools operated by Universal at Memphis, Cleveland, Marion, Ill., Oklahoma City, Rochester, St. Paul and Wichita have not yet been inspected.

A DEMONSTRATION of glider flying was staged in St. Louis recently by the Spanish Lakes Glider Club at its field in North St. Louis. The club is attempting to interest prospective aviation students in learning to fly gliders. Two glider pilots from Germany had charge of the demonstration. They were Alois Koch and Otto Richeter. Harry Kutchins, the only licensed glider pilot in St. Louis, is in charge of the glider club.

A DEAL for the purchase of 630 acres of land by the Universal Aviation Corporation for the construction of an airport in the Horseshoe Lake district near East St. Louis, has been completed with the purchase of the last parcel of ground totaling 266 acres. This airport will be the fifth to be located in the St. Louis district. The

Horseshoe Lake district is within easy access of downtown St. Louis and offers landing facilities for seaplanes.

Passenger and mail planes of the Universal Aviation Corporation are to be equipped with radio receiving sets prior to the beginning of the bad weather flying period. E. M. Russell, meteorologist for the company, is perfecting a system of weather reports which he expects will be of great assistance to pilots. Final tests of a two-way communication by telephone and radio, from a ground station to a plane in the air, were completed recently when Paul Goldsborough, vice-president in charge of operations of the Universal Aviation Corporation, carried on a conversation from his office in St. Louis with a pilot flying 2,500 feet over New York City.

A second air mail service between St. Louis-Kansas City and Omaha was opened September 15th by the Universal Aviation Corporation. The new service means both morning and evening arrival and departure of air mail between the cities affected. The new route was authorized some time ago but its opening was held up until beacons and emergency landing fields between St. Louis and Omaha had been completed by the Department of Commerce. The old run between St. Louis and Omaha carries both mail and passengers. This system will be continued, and the new run will be for mail exclusively or the time being.

DURING the month of September St. Louis celebrated the first anniversary of

its regular passenger airline—the St. Louis-Chicago run of the Robertson division of the Universal Aviation Corporation. The company announced that it had transported 2,059 passengers between the two cities in planes flying a total of 257,444 miles, carrying out schedules on a basis of 98 per cent efficiency. The service now requires two round-trips daily using Fokker Universals. In July, the company announced, the planes of the Universal system both in the St. Louis-Chicago division and the line from St. Louis to Kansas City and Omaha had completed every scheduled trip on time for connections for both mail and passengers. A total of 523 passengers was carried. Air mail aggregated 12,807 pounds, 5,181 pounds being carried on the Omaha division and 7,826 on the Chicago division. In addition, more than 100 pounds of express was carried.

ST. LOUIS is the key point in a new transcontinental air-rail route put in operation September 1st by the New York Central Railroad, the Southwest Air Fast Express, Inc., the Texas and Pacific Railroad, and the Standard Air Lines. The operation of this line inaugurates a new New York to Los Angeles air-rail service by way of St. Louis. Passengers leaving New York on through Pullmans of the New York Central lines at 8:30 A. M. arrive in St. Louis at 7:45 the following day in time to depart on the SAFE plane leaving Lambert-St. Louis field at 8:30 A. M. for Sweetwater, Texas, to make a connection with the Pacific Coast.

(Continued on next page)

# SWALLOW

## WITH RUTH ELDER IN THE WOMEN'S AIR DERBY

FROM SANTA MONICA TO CLEVELAND

again demonstrated Swallow leadership in stability and performance.

In competition with many planes (seven of one make) one lone Swallow flew thru to a perfect finish without trouble of any kind—and after many demonstration flights thruout the country is again on Clover Field, as good as the day it left the factory.

*When selecting a plane—be safe—buy a Swallow.*

The 3-place open cockpit Standard Swallow is just the ship for the sportsman and business man. Structurally built to stand the hardest gaff of daily flying, and engineered to bring amazing flying qualities. This ship is available in a choice of color combinations. The Swallow Standard may be secured with Wright J-5, Whirlwind Five 165 H. P., Axelson, and OX5. (Wright powered Swallow pictured at right.)

Write now for complete information on the famous Swallow Line of Ships



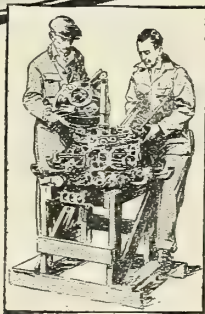
**SWALLOW AIRPLANE COMPANY, WICHITA, KANSAS**

**Western Distributors: JAMES E. GRANGER, INC., Clover Field, Santa Monica, Cal.**



Travel Air Airplanes  
Curtiss Robin Airplanes  
Wright Motor Service  
Challenger Motor Service  
Pyle National Aviation and Airport  
Lighting Equipment  
Stromberg Carburetors  
Flightex Fabric  
Resistal Goggles  
Meyrowitz Goggles  
Pioneer Instruments  
Rand McNally Maps  
Mobiloil Aero H  
Berryloid Products  
Standard Steel Propellers  
Hartzell Propellers  
Supreme Propellers  
Scintilla Magnets  
Russell "Lobe" Parachutes  
Irvin Airchutes  
A. C. Spark Plugs  
B. G. Spark Plugs  
Goodyear Tires and Tubes  
Goodrich tires and tubes, shock cord, hose, etc.  
Black & Decker Shop Equipment  
Pyrene Fire extinguishers  
Blackhawk Tools  
American La France Fire Extinguishers  
"T-A-T Airmail" Flying Clothing, Helmets  
Exide Batteries

\*This emblem on the roof of a hangar shows a branch of Southern Aeromotive Service—the most complete in the South.



Airmen who know the South mark each of the 16 S.A.S. Ports of Service on their Maps

At 16 strategic points, S.A.S. offers complete aircraft and motor service, parts, aero supplies. Also

Airport engineering, designing, equipment, construction.

In the South, head your plane for an S.A.S. port, whether it is re-fueling, patching a wing, checking or re-building your motor or just for a pair of goggles. Service awaits you there at the hands of Government licensed mechanics, prompted by an intelligent understanding of your problems.

Southern Aeromotive Service, Inc., is a division of Southern Air Transport System, operating air mail and air passenger lines throughout the South. It is in S.A.S. shops that ships of Southern Air Transport Systems are serviced.

The same service and equipment which maintains the splendid operations record of S.A.T. Ships is open to you at any of the 16 strategic ports of S.A.S. service.

No matter where you are, your call to the nearest S.A.S. Station will bring a plane with mechanic, supplies, equipment or parts to you immediately.

WATCH FOR THE S. A. S. CATALOGUE

# Southern Aeromotive Service, Inc.

DIVISION OF SOUTHERN AIR TRANSPORT SYSTEM



(Missouri News continued)

ST. LOUIS is to have a radio beacon erected by the federal government. A lease has been secured on a plot of ground across the road from Lambert-St. Louis Field and construction of the station will be started at once. The site for the station was selected by Frederick Stephens, government radio expert, who will have charge of the construction work.

## OHIO

[T. E. LUNSFORD]

AIRPORTS are public utilities, and cannot be operated by boards of control created by municipalities, according to a recent decision made by Attorney-General of Ohio, Gilbert Bettman. The opinion of the Attorney-General was given in connection with a proposed ordinance at Mansfield, looking toward the creation of such a board.

WORK of developing Herrick Airport in Richmond Heights Village, Cleveland, is going forward, according to Maj. Louis G. Meister, local manager of the Curtiss Flying Service and manager of the port. A brick and steel hangar, 100 by 120 feet, is being built at the south end of the field. The temporary runways now in use will be replaced by two hard surface runways 2,500 feet long and 200 feet wide, and additional hangars will be built.

THE Goodyear-Zeppelin Corporation has ordered 96 helium gas storage tanks from the A. O. Smith Corporation, Chicago. The tanks will have a minimum capacity of 1,000,000 cubic feet, and will be used at the Akron Municipal Airport.

WILLIAM E. TELZROW, formerly financial secretary of the Cleveland Citizens' League, has been appointed manager of the Cleveland Institute of Aviation, Inc., which has opened a flying school in its newly built hangar at Cleveland Airport.

WORK has begun on the erection of a new addition to the plant of the Waco Aircraft Company at Troy, Ohio, which will increase the floor space of the factory. The new building will be approximately 44 feet wide and 285 feet long. The structure will be built of steel and concrete, following the same type of construction used in the present factory building. It is expected to have the building completed within the next 90 days. The steel will be erected by the Dayton Structural Steel Co., and the remainder of the work will be done under the direct supervision of Waco officials.

PLANS for the volume production of two new airplane engines, construction of a new factory building and installation of equipment, to cost in all approximately \$750,000, have been announced by officials

of the Dayton Airplane Engine Company, Dayton, O. The company, which at present manufactures Dayton Bear four-cylinder airplane engines, has completed plans for manufacture of six- and eight-cylinder plane motors with twin cylinder blocks, opposed at 180 degrees rather than the customary 45 or 90 degrees, with half of the cylinders furnishing power strokes from each block to the center shaft.

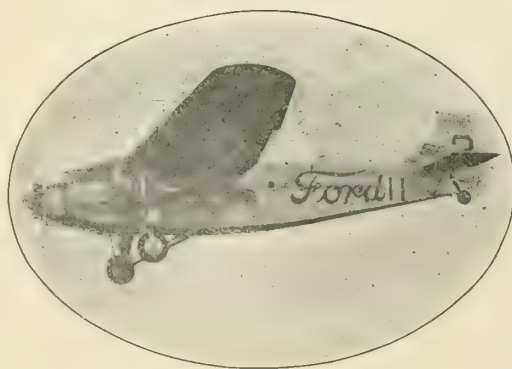
THE establishment of an airship research institute at the Akron Municipal Airport is assured by action of the Akron City Council in authorizing the issuance of \$100,000 in bonds for this purpose. The action is in connection with an offer of the Gugenheim Foundation to furnish \$250,000 toward the creation of the institute.

JOHN M. VORYS, Ohio State Director of Aeronautics, recently ordered the City of Columbus to comply within 60 days with the newly adopted State regulations prescribing standard types of signs for marking cities with respect to landing fields. A neon sign costing \$20,000 on top of the A. I. U. tower has been proposed. Such a sign would be visible for more than 150 miles.

THE University of Akron will broaden its aviation instruction this Fall with the opening of a new course in elementary aerodynamics in the engineering college, according to Harold Queen, instructor. The

(Continued on next page)

## ANOTHER OUTSTANDING CONTRIBUTION TO AVIATION



LATA Balsa has contributed much in solving many of the aircraft industry's construction, insulation and isolation problems.

Because of its exceptional strength and extreme lightness Lata Balsa is now successfully used for streamlining, sound deadening, insulation, filler, and structural members. Its strength and lightness (93% air cells) makes possible the creation of a perfect air foil which adds materially to the plane's lifting power without increasing its weight.

The Ford Motor Car Company in its tri-motor construction uses Lata Balsa panels surfaced on both sides with FIRE PROOFED duralumin veneer.

Our engineers have been working closely with many of the leading airplane manufacturers. They are ready to tell you the many economical uses of Lata Balsa. Write for a sample.

**THE Balsa WOOD COMPANY**  
158 Pioneer Street Brooklyn, N. Y.

# LATA Balsa WOOD

# The aviation industry's greatest advertising medium . . .



## J U N E



## J U L Y



## A U G U S T



\*In the case of "Aviation," which is a weekly, the number of advertisers contained in each issue was counted and an average for the month determined.

## C I R C U L A T I O N

Net paid circulation for a six months' average—ending June, 1929.

AERO DIGEST	73,842
AIRWAY AGE	7,704
AVIATION	19,822
WESTERN FLYING	14,000



**M**ORE advertisers spent their money in AERO DIGEST'S NATIONAL AIR RACE NUMBER than in the Air Race issue of any other aeronautical magazine. And more advertisers spend their money in AERO DIGEST regularly than in any other aeronautical publication!

These charts show, in proportion, the number of advertisers represented in AERO DIGEST as compared with the number represented in the three next largest publications.\* The charts indicate, quite definitely, that the aviation industry considers AERO DIGEST its greatest advertising medium, and we reproduce these comparisons here as a guide for those who are confronted with the problem of placing their advertising where it will do the most good.

## A I R R A C E N U M B E R



**A** COMPARISON of circulation figures reveals that AERO DIGEST also has more readers than all three of these other publications combined . . . in a proportion of almost 2 to 1. And since a publication's readers play so large a part in the success of the advertising it contains, isn't it logical that AERO DIGEST is the greatest advertising medium in the aviation industry?



"The Magazine of the Air"

# AERO DIGEST

220 WEST 42nd STREET, NEW YORK



(Ohio News continued)

new class is designed as the first of several in a general aeronautical engineering course. It will be open to all qualified students, but is offered especially for engineering students in the pre-junior year. Topics to be covered in the course are: History of airplanes, theory of fluid motion, fluid resistance, and dynamic similarity; study of airfoils, effect of variation of shapes, selection of airfoils for given types of airplanes, characteristic curves, and performance calculations for complete airplane stability, static and dynamic.

**WARD T. VAN ORMAN**, winner five times in the national balloon race and twice victor in the international balloon competition, has been selected director of the ground school of the Goodyear-Zeppelin Corporation. Under Van Orman's direction students will be trained in ballooning, airship handling, meteorological, radio and navigational work.

**WHEN** the endurance fliers, Dale (Red) Jackson and Forest O'Brine, visited Toledo, Ohio, the local branch of the Curtiss Flying Service arranged an unusual program to increase public interest in aviation. A Curtiss Challenger Robin with the fliers was taxied down the main streets of Toledo for approximately a mile to the mayor's stand where they stepped out of the plane before the mayor's platform and were welcomed to the city. Approximately nine days of preparation were required to survey the city and to find streets wide enough to accommodate the plane, the span of which is forty-one feet. In some places along the line of march the wing tips overhung the sidewalk five to six feet.

## COLUMBUS

[W. DONALD WALTER]

**PORT COLUMBUS** was the scene of much activity during the week preceding the opening of the National Air Races. More than twenty ships participated in the Good Will Tour, which started from the port on August 21. This tour flew over most of the cities in Ohio. Overnight stops were made at Portsmouth, Marion, and Lorain, and luncheon stops at Hamilton, Alliance and Toledo. Despite very unfavorable weather conditions on the second day out, practically all the ships finished the tour.

The last hop was from Lorain to the Cleveland Airport, timed to arrive during the first afternoon of the races.

**A**N interesting legal case has come up in connection with the use of Port Columbus by visiting flyers. A man landed after dark at the port, and because no lights were on, damaged his ship. He is now suing the City, alleging that the damage to his plane was due to the city's negligence in not having the airport lighted.

**PLANS** have been drawn for the removal of Reserve activities from Norton Field, Columbus, to the north side of Port Columbus. This would entail an expense of about \$150,000. A special appropriation would be necessary for this purpose.

**TRANSCONTINENTAL AIR TRANSPORT** has erected on top of its hangar at Port Columbus an illuminated sign, bearing the letters "T A T". This sign will be visible for a considerable distance from the air.

## CLEVELAND

**A**N expansion of plant and production facilities to take care of increasing aircraft orders has been announced by officials of the Great Lakes Aircraft Corporation of Cleveland. Work on a 10,000-foot addition will start shortly, and plans call for its completion in about six weeks. This is the second addition made by the company within three months. The added space will be used for production of four-place, twin-motored amphibians, a new product that will go into quantity production shortly.

Twenty-five Great Lakes Trainers, manufactured by the Great Lakes corporation, have been sold to the Sioux Skyways of Sioux Falls, S. D. Sioux Skyways will be the Great Lakes distributor in eastern South Dakota. The Trainers will be powered with American Cirrus, four-in-line air-cooled engines.

**CHANGES** in the operating departments of Thompson Products, Inc. of Cleveland, were announced recently by C. E. Thompson, president of the concern. E. A. McBride will take over the position of factory manager, Harry Bubb has been appointed chief metallurgist, J. M. Kerwin will

become general superintendent, and Daniel Kelleher will act as chief engineer of Thompson Research, Inc.

**A CONTRACT** to manufacture more than a million dollars worth of motor valves for the Pratt and Whitney Aircraft Company, Hartford, Conn., has been awarded to Thompson Products, Inc., Cleveland, according to L. M. Clegg, general manager of the Thompson firm. The contract covers valves to be used in Pratt and Whitney Wasp and Hornet motors for one year.

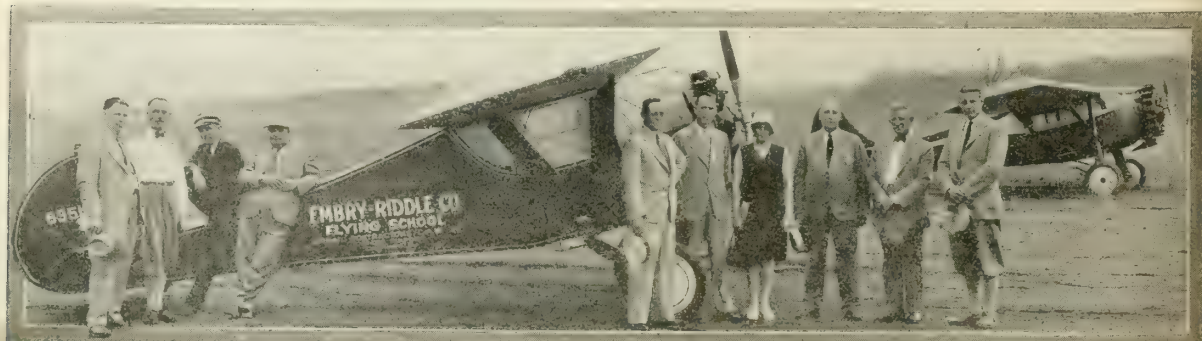
Total airplane motor valve shipments of Thompson Products for the present year will exceed \$2,000,000, Mr. Clegg estimated. This is three times the amount shipped in 1928. A new four-story addition to the company's Cleveland plant, now nearing completion, will be devoted largely to the production of airplane valves.

In order to establish a base through which Canadian and British interests may be better served, Thompson Products, Inc., has purchased a ten acre plot of ground at St. Catharines, Ontario, for the erection of a factory. The complete line of Thompson products, valves, pistons, pins, bolts, drag links, tie rods and brake rod assemblies, will be manufactured at the new plant.

**THE** Cleveland Pneumatic Tool Company of Cleveland, Ohio, manufacturer of Aerol Oleo-pneumatic landing struts, has announced the development of a tail-wheel oleo-pneumatic unit which will provide three-point suspension for planes. Twenty-three manufacturers have adopted Aerol struts as standard equipment.

**THE** Cleveland News, newspaper of Cleveland, Ohio, recently purchased a Fairchild 71 monoplane powered with a Wasp 425 horsepower engine for publicity work. The purchase was the result of profits realized by the newspaper by the use of a plane for publicity prior to and during the National Air Races. Twenty or more airplanes made a 1,000 mile air tour over the State of Ohio prior to the opening of the National Air Races. They left Columbus, the state capital, on August 21st, going to or over nearly every important city in the state, and arriving back in Cleveland on Saturday, just before the opening of the Race week. This tour was sponsored by the Ohio Chamber of Commerce.

(Continued on next page)



Participants in the Indiana Air Tour at Gary Airport; the ship is a Monocoupe of the Embry-Riddle Company, Cincinnati

Photo from C. G. Brodhecker

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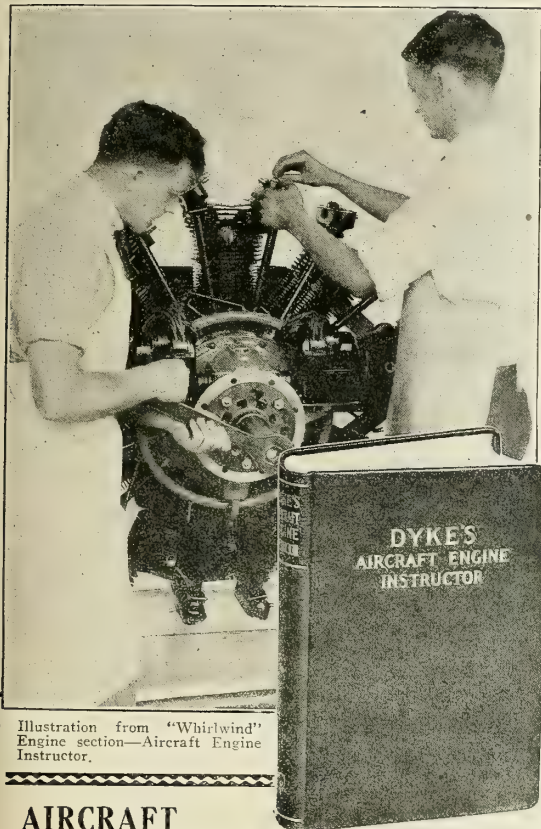


Illustration from "Whirlwind"  
Engine section—Aircraft Engine  
Instructor.

### AIRCRAFT ENGINE INSTRUCTOR

By A. L. DYKE

Engineers from some of the best known companies assisted Mr. Dyke in the preparation of this great book, which covers modern Aircraft engines and miscellaneous accessories and equipment, such as carburetors, magnetos, starters, generators, aeronautic instruments, etc. Adequate space is devoted to the Wright "Whirlwind," the "Wasp," Curtiss, Packard, Fairchild-Camenz (engine without crankshaft or connecting rods), Curtiss OX-5 and other leading engines, including some well known foreign makes. Right up-to-date, including the construction and maintenance of metal (and wood) propellers, principle of operation of superchargers and rotary inductions, discussions and illustrations of the "Cyclone," "Hornet," "Chieftain," "Challenger," Warner, Velie, Anzani, etc.

The Aircraft Engine Instructor is more than a book—it's a complete training on aircraft engine construction, maintenance and operation; an indispensable source of ready information for the mechanic and pilot alike.

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### AIR NAVIGATION and METEOROLOGY

By Capt. R. DUNCAN

Licensed Pilot in U. S., Canada, France, England

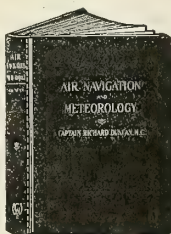
Here is a book that contains the exact information needed by a flyer to become an efficient air navigator.

The entire subject is presented in a simple non-technical way without the use of mathematical problems. It explains the meaning of all technical words and terms and deals with maps and charts in a way that the reader cannot fail to understand. The principles of air navigation, weather forecasting, magnetism and magnetic poles, are thoroughly explained before taking up the practical side of flying and the use of flying instruments.

Other sections of the book cover the airplane compass and all instruments used in air navigation, such as the Air Speed Indicator—Altimeter—Course and D-ift Indicator—and others.

Complete instructions are given for calculating magnetic variations, deviations, effect of wind on plane in flight (drift), and other problems of air navigation. Night flying, night flying equipment.

Over 240 pages, 70 illustrations. Flexible binding. Sent postpaid \$3.00.



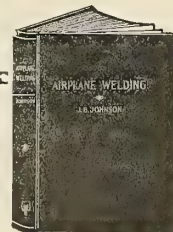
### AIRPLANE WELDING

By J. B. JOHNSON, M. E.

Between the covers of this timely book is packed every fact and every bit of information available today, on the art of welding in aircraft design, construction and repair. It covers every method of welding—every type of weld—every weldable metal—in plain, every day language. It shows how welding enters into aircraft design—how ships are fabricated and built with welds—how repairs are made, and best of all—it shows you how to make all the different kinds of welds and how not to make them too, so you can't go wrong. The author has had a wide experience in actually doing and supervising the kind of work which he describes so well for you in his book. He has conducted experiments and made thousands of tests of various kinds, and is considered everywhere a real authority on the subject.

A book that talks right from the shoulder in the language of the shops—easy to read and easy to understand. You can get every point not only easily and quickly, but in a way so you will never forget it.

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*(Ohio News Continued)*

The Fairchild plane purchased by the *Cleveland News* was the plane exhibited by the Fairchild organization at the National Exhibition. It carries four passengers and a pilot. The rear of the cabin has been converted into a lavatory compartment. The interior is finished in dark red leather. Dome lights are used for artificial lighting. The exterior of the plane is a two-tone red and cream combination.

## INDIANA

THE Davis Aircraft Corporation of Richmond, Ind., recently completed contracts for the distribution of the Davis V-3 Monoplane with the T.A.T. Flying Service, Inc., of Ft. Worth, Texas, and the Aero Corporation of California, Inc., of Los Angeles. T. A. T. Flying Service, Inc., is to distribute the Davis in Louisiana, Georgia, Alabama and Texas. The Aero Corporation of California, Inc., is to distribute the Davis in California, Arizona and New Mexico.

WORK is to start at once on an airport for the city of Muncie, Ind. Leonard Macomber, Inc., airport engineers and builders, has been retained by the Muncie Airport Commission as engineers and contractors. The property, which was presented to the city by Abbott L. Johnson, president of the Muncie Airport Commission, is located only 2.8 miles north of the post office on the main highway. The first 160 acre tract will be ready by early spring.

A 24-inch directional beacon of two-million candle power has been ordered and will be installed on the Old National Bank building in Evansville, Ind., just beneath the present revolving beacon. This will shoot a stream of light directly at the Municipal airport. The Old National Bank is installing the beacon.

## SPECIAL DAVIS RACING MONOPLANE

THE Davis monoplane which won the All-Ohio Derby by a margin of 17 minutes, covering the 533 miles at an average speed of 112.8 miles per hour, was essentially a stock Davis V-3 monoplane, as manufactured by the Davis Aircraft Corporation of Richmond, Indiana. The principal differences were in the engine used, and the N.A.C.A. cowl which was developed for this plane in the Davis plant.

The new LeBlond 66 radial engine, with a piston displacement of 266 cubic inches, was used in the racing plane. This engine is very similar to the standard LeBlond 5D60 engine used in the stock Davis V-3, with the exception that it employs steel barrel cylinders, with aluminum heads, and has  $\frac{1}{8}$  inch larger bore. Valve rocker arms are carried on ball bearings, instead of plain bronze as in the standard 5D60 engine.

The use of the N.A.C.A. cowl, streamlined wheels, a covered front cockpit and an adjustable pyralin cover for the rear cockpit increased the speed considerably. All exposed parts were streamlined either by the use of aluminum sleeves or molder's clay.

A small steel propeller was used. The plane was fueled for the Derby with Sohio ethylized gasoline. Kendall Oil was used for lubrication.

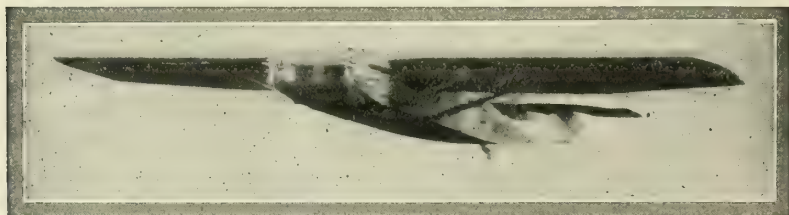
Top speed of the plane, two ways over a measured mile, was 116.2 miles per hour, as compared to 95 miles per hour for the stock V-3. This gain of 21.8 m. p. h. was accomplished primarily by proper streamlining, N.A.C.A. cowl and cockpit covers.

CAPITOL AIRWAYS, INC., of Indianapolis, has opened its ground school under the direction of M. C. Hack. Fred Lanter is chief instructor, assisted by Sgt. Charles Cunningham and James F. Douglass.

CURTISS Flying Service of Indiana, Indianapolis, and Interstate Airlines, Inc., Evansville, have entered into one of the largest airplane distributor contracts ever written.

The contract provides that Interstate buy all its planes for mail, taxi and school work from Curtiss for the next eighteen months. The contract, valued at \$300,000 covers all planes handled by Curtiss, including the Robin, Cessna, Fledgling, Sikorsky, Ireland, Command-Aire and others. Interstate expects to purchase between 50 and 60 planes under the contract.

THE Fort Wayne City Council by a vote of 12 to 4 passed a \$200,000 bond issue ordinance for improvements at the Paul Baer municipal airport. It is planned to erect an administration building and hangar.



The Chapman Air-liner, with landing gear retracted, in flight. Designed and built by V. J. Burnelli.

## Some Of The Outstanding Advantages Of The Burnelli Type Are:

Power Plant Accessible While In Flight, Reduction of Head Resistance, Fuselage Lift, Decreasing Landing Speed, Increased Cabin Space, Reduced Turning Moment On One Engine, Practical Landing Gear Retraction, Structural Simplicity, Efficiency, and Rigidity.

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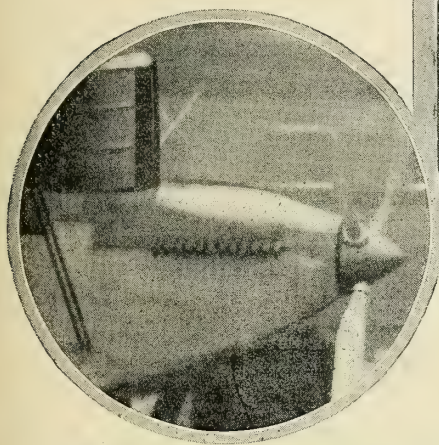
Large airplanes  
constructed under  
proprietary and  
patented design  
features of the  
Burnelli Type



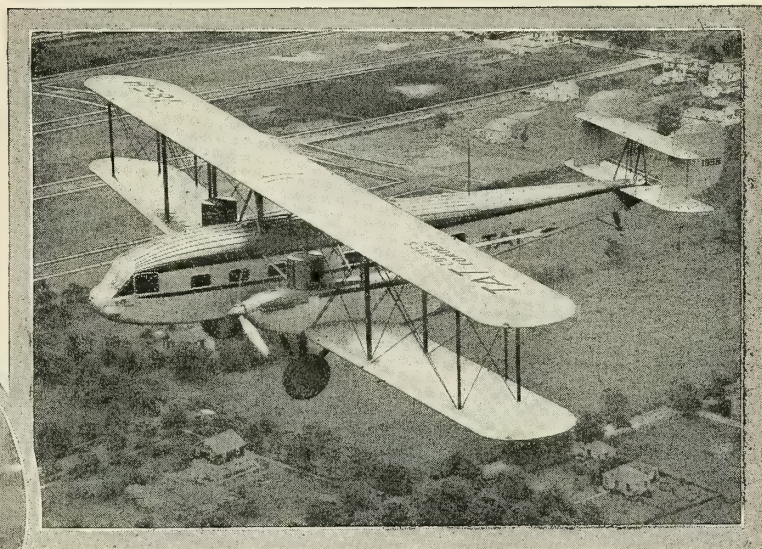
# Curtiss Conqueror

## 600 Horsepower Engine

**America's most powerful engine now available for commercial use**



*This interesting close-up of the Conqueror in action shows the remarkable engine streamlining . . . and exceptionally low frontal area.*



*The 18-passenger Curtiss Condor transport built for the T. A. T. coast to coast air-rail service, is powered with 2 Conqueror engines. This huge plane with full load takes off and climbs on one engine.*



*This Curtiss Falcon was specially designed as a mail carrier. The liquid-cooled Conqueror is designed to develop great speed and dependability so necessary to the mail planes of today.*

**M**ORE power . . . more speed . . . continuous reliability under greatly varying conditions. Essential requirements these, on mail and transport lines today. And Conqueror is the answer to these new demands.

A 600 Horsepower, 12-cylinder, type, liquid-cooled engine, Conqueror embodies the vital requirements of speed . . . power and low head resistance. More powerful than any other American engine in production, it is amazingly trim and compact, representing the highest development of this type of engine, inherently low in frontal area.

The Conqueror brings greater reliability . . . longer life . . . on air routes of greatly varying air conditions. Proper heat control, made possible through liquid cooling, mini-

mizes the damaging effects of wide variations in operating temperatures.

Better vision . . . less vibration . . . much less noise—these are important factors, too, where passenger travel is now daily supplementing and rivaling rail and water transportation.

This Conqueror, thoroughly proven in military service, deserves your careful consideration in the selection of your new mail and transport air equipment.

Built by the Curtiss Aeroplane and Motor Company, it is the product of 25 years of development in engine-building by the finest staff of engineers in this country. A line from you will bring full information and a comprehensive booklet. Curtiss Flying Service, Dept. 30, 27 West 57th Street, New York, N. Y.

## CURTISS FLYING SERVICE

*“World's Oldest Flying Organization”*



## MICHIGAN

[KARL F. ZEISLER]

### New Michigan Air Services

**A**NNOUNCEMENTS of three new passenger airlines serving Michigan have been made in Michigan during the last month. One of the lines, an amphibion service between Grand Rapids and Milwaukee, has already begun operations. The second, and additional service on the Stout Air Service connecting Kalamazoo to its Chicago-Detroit line, is ready to start, and the third, a loop service around Lake Michigan, is scheduled for next spring.

The Kohler Aviation Corporation inaugurated service on its Grand Rapids-Muskegon-Milwaukee trans-lake passenger line August 31, using two Keystone-Loening amphibions, which make three trips daily in each direction. The flying time is one and one-half hours.

With the opening of Lake Michigan resort centers next spring, Foster Airways, Inc., Lansing, Mich., will operate two amphibion planes on a loop-passenger service completely encircling Lake Michigan. Muskegon will be headquarters for the line, with a plane leaving each day in both directions. The northern route will include Ludington, Manistee, Traverse City, Petoskey, Charlevoix, Mackinac Island and Marquette, in Michigan, and Manitowoc, Sheboygan, Racine, Kenosha and Milwaukee in Wisconsin. Chicago will be the terminus of both north

and south routes, the latter of which will include Grand Haven, Holland, Benton Harbor and St. Joseph.

The directors of Foster Airways are James D. Foster, president; J. F. Hofstetter, H. H. Landay, John Kasurin, Don S. Hutchinson, R. Z. Herskey, H. I. Mattson, C. L. Barber, and Joseph C. Rieman. Capt. Joseph Sine, reserve officer, 310th Aero Squadron of Selfridge Field, and Lieut. John Fleming, of the same organization, will be in charge of the technical staff. The company holds Curtiss franchises for the Michigan towns named and plans to operate schools and taxi services at six ports. Graduate schools will be located at Muskegon and Lansing. Amphibion ships for the service and for training will be selected at the aircraft shows this winter, Mr. Foster stated.

In anticipation of the new service, Muskegon recently let a \$10,000 contract for the construction of a ramp for water aircraft on its municipal dock.

Kalamazoo has been promised connection on the Detroit-Chicago passenger line of the Stout Air Services, Inc., with three planes daily to Detroit and Chicago.

### Landing Fields in the Michigan Peninsula

**M**ICHIGAN'S Upper Peninsula, once famed for its lumbering and mining activities, is coming to the fore as a resort center, and, concurrent with this development, is the utilization of the airplane as an

attraction to tourists. Through the efforts of the Upper Peninsula Airways Commission, headed by Frank L. Betts, of Menominee, sixteen landing fields are in process of construction this year in contrast to the two fields available in 1928.

Sault Ste. Marie and Chippewa county are developing a 160-acre field one and one-half miles from the business district of the Soo. St. Ignace, on the Straits of Mackinac, has cleared a field providing runways of 2,200 and 2,400 feet, a mile north of the city. Newberry is at work on a field 2,640 feet square with an all-direction landing surface. Manistique has a small field with 2,200-foot runways. Blaney, a resort development, has one of the best airports in the peninsula. Munising has prepared a long, narrow field for future expansion. The three cities of Marquette, Negaunee and Ishpeming have united in improving a field at Eagle Mills. Houghton and Hancock are other Upper Peninsula cities that have united on an airfield located on Portage Lake.

Ontonagon benefits from a nearby county airport. Iron River has a large field in addition to the port developed nearby at Kingsford by the Ford Motor Company. Escanaba is served by a private field owned by the Upper Peninsula Airways Corporation, and Menominee has a large field four miles from the city with gravelled runways.

Other airport activities throughout the State include: completion of graveling, of

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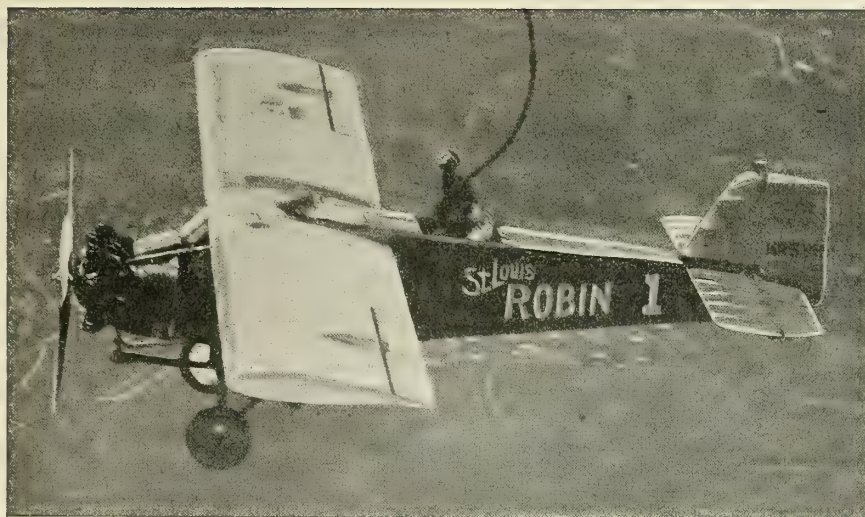
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Super performance,  
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**The Curtiss-Robertson Monoplane**

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establish a new World's Endurance Record for sustained flight, powered with  
**Curtiss Challenger Motor**  
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This is a wonderful accomplishment for the intrepid pilots, proves the excellent reliability of both plane and motor and the perfect lubrication secured with GULFPRIDE OIL.

*The Curtiss-Robertson Airplane and Manufacturing Company desired the best oil obtainable for this flight and sent us order for GULFPRIDE OIL 120. The oil was shipped to them promptly via express from our warehouse stock. . . . .*

The same grade of GULFPRIDE OIL has been used in establishing other world's records for lifting power, altitude and speed and is available to all pilots. Ask for it at airports.

GULFPRIDE OIL 75 for automobile engines is for sale at Gulf Dealers and Gulf Service Stations.

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(Michigan News continued)

east and west runways at the Ann Arbor airport; lengthening of runways at the Kalamazoo airport and further grading of the field; widening of the highway along Kellogg airport at Battle Creek; erection of a hangar and completion for the runways at the Buhl Aircraft Company at St. Clair, and approval of a \$44,000 budget for the improvement of the Muskegon county field by the road commission. Communities planning airports in Michigan include: Port Huron, Marshall, Plainwell and Adrian.

HAVING secured a ten year lease on a site on the Pontiac Municipal Airport, the Thompson Aeronautical Corporation, operators of C. A. M. 27, serving Michigan, and of an amphibian passenger service between Detroit and Cleveland, started work October 1 on a \$100,000 hangar, office and service building project that will be made the administrative and service headquarters for the company in Michigan.

Roberts-Wright Company of Cleveland drew the plans for the new buildings, which consist of an administrative office 40 by 120 feet, two stories high of brick and stone construction with accommodations for a first floor plane display room and offices, with the second floor devoted to class rooms for Thompson's flying school. The hangar will be 120 by 120 feet, with a clearance of 20 feet.

Adjoining will be buildings containing the heating plant, welding shop and dope room. Twelve to fifteen men will be regularly employed in the shop, and all Wright motors in Michigan and Indiana as well as Thompson's 19 planes in regular operation, will be serviced there. Buildings will cost \$70,000 and equipment \$30,000, according to Kenneth Matucha, Pontiac manager for the firm. Pontiac Airport is the northern terminus of Thompson's airmail line between Detroit and Chicago, and has been used by the company since the completion of the field in November, 1928.

## DETROIT

THIRTY acres of land has been purchased at Long Beach, California, by the Detroit Aircraft Corporation as the future factory site of the Lockheed Aircraft Corporation, according to a recent announcement by officials of the Detroit Aircraft firm. A factory giving increased production facilities will be ready for occupancy by February accord-

ing to the plans, and all Lockheed activities will be centered at the new location. Captain Carl B. Squier, formerly of the U. S. Army Air Corps was recently appointed general manager of the Lockheed division.

### Stinson-Detroit Approved as Seaplane

THE six-passenger Stinson-Detroit has been granted Approved Type Certificate 212 for operation as a seaplane by the United States Department of Commerce. The tests were made on Lake St. Clair. The Stinson seaplane is powered with the Wright Whirlwind 300 engine and fitted with Edo J floats. The wing span is forty-seven feet, and overall length thirty-four feet nine inches. The plane has seating arrangements for five passengers in addition to pilot and is fitted with dual wheel control. A large baggage compartment is located at the rear of the passenger compartment.

Weight of the Stinson seaplane empty is 3,198 pounds and with a useful load of 1,402 pounds has a total gross weight loading of 4,600 pounds. Top speed is 125 and cruising speed is 105 miles per hour. Initial rate of climb is four hundred seventy-five feet per minute.

ROSS W. JUDSON, president of the Continental Motors Corporation, recently announced the organization of the Continental Aircraft Engine Company as a subsidiary for the purpose of manufacturing and developing aircraft engines. Officers of the new corporation are: W. R. Angell, president; Robert Insley, vice president; R. M. Sloane, treasurer, and W. C. Keith, secretary. These officers, with W. A. Frederick, vice president in charge of engineering of Continental Motors Corporation, constitute the board of directors.

Air tests of the new 160 horsepower Continental radial engine have been satisfactorily completed according to C. P. Russell, aeronautical sales manager of the Continental corporation. A four-place cabin monoplane powered with the new engine had several hundred hours of flying time and from data collected fuel consumption at a cruising speed of approximately 100 miles per hour was shown to be less than 8 gallons per hour. Cylinder and cylinder head temperatures ran low, according to Mr. Russell.

THE Paramount Aircraft Corporation recently completed its first Cabinaire 165, powered with a Whirlwind 165 engine. The new model is similar in all respects, other

than power plant, to the Cabinaire 110, using a Warner engine.

The 165 is capable of a high speed of 124.8 miles per hour and has a landing speed of 40. The total weight empty is 1,563 pounds.

## WISCONSIN

[WILLIAM SCOLLARD]

PASSENGER service and instruction for pilots and mechanics will be given by Goodall Airways, Inc., which was organized at Beloit, Wis., recently. Directors of the new organization are: E. E. Crowley, H. C. Freeman, A. Hansley and E. McNeany. Stamford White is president; A. Hansley, vice president; and E. McNeany, secretary and treasurer.

MILWAUKEE'S second annual state fair aircraft show was held at Milwaukee during the week of August 26-Sept. 1 with a large attendance. Committees for the show were selected from the Association of Commerce air service committee, the Milwaukee Advertising Club and the American Legion, sponsors of the show. Thomas L. Edwards, war time marine corps pilot, was chairman.

There were fifteen airplanes on display. The Wisconsin Glider Club exhibited one finished glider and another partially built. Scale models of airports in this country were shown, as well as a lighted map showing air mail routes of the United States. The Milwaukee Public Library exhibited a complete set of aeronautical books, pamphlets, periodicals and other educational literature. There were stunt flights during the entire week.

COMPLETION of the Municipal airport at Darwin Station, Madison, Wis., will cost the city \$200,000, according to the council airport committee. Work on the airport has been stopped temporarily pending the offer of the Royal Airways Corp., Madison, for the city to use the Royal airport.

A NEW trans-continental airline, with Milwaukee as the base of operations, and with Halifax, Nova Scotia, as the eastern terminal, and Vancouver, B. C., as the western, was announced last month following a conference of Carl Herzfeld, chairman of the Milwaukee Association of Commerce air service committee, with Colonel L. H. Brittin, vice president and general manager of Northwest Airways.

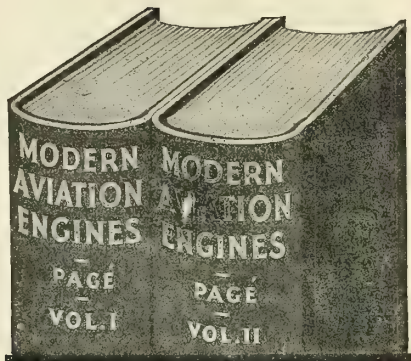
The line will be operated by Northwest in conjunction with the Western Canadian Air Lines. Northwest now operates the Twin Cities-Milwaukee-Chicago and the Fox River Valley lines. A new line will be projected by Northwest across Lake Michigan from Milwaukee to Detroit using amphibian planes. Northwest will also extend its line westward from the Twin Cities to Winnipeg, Man., via Fargo, N. Dak. Transfer to Western Canadian planes will be made at Detroit for Halifax and at Winnipeg for Vancouver.



Paramount Cabinaire biplane powered with a Wright Whirlwind 165

# Save Weeks of Ground Work with these two great new books

Here is the most complete information on all types of aircraft motors ever published in one treatise. Written by a leading instructor and authority for flying schools, pilots, field mechanics, shop men, engineers, students and beginners. A gold mine of necessary information for everyone, everywhere, in the aviation profession. A monumental work by a master instructor and pioneer aeronautical engineer.



2000 (6x9) Pages; 1000 Specially Made Illustrations; 50 Charts and Tables.

*Just Off the Press*

## MODERN AVIATION ENGINES

*Their Design, Construction, Installation, Repair*

By MAJOR VICTOR W. PAGÉ, Air Corps Reserve U. S. A., Author of "Modern Aircraft", "A B C of Aviation", "Everybody's Aviation Guide", etc.

More than 2000 large (6x9) pages, fully illustrated with 1000 engravings and diagrams, including 50 special charts and tables.

Now you can have from one of America's leading aviation authorities the two most comprehensive and the two most important aviation books ever published.

The author spent five years in gathering the data and in the preparation of these two volumes. They bring you practical, up-to-the-minute, authoritative information on the original design, the construction, the installation, the operation, the inspection, the repair and use of all types of aircraft engines.

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These two wonderfully illustrated volumes contain forty-six chapters describing the leading aircraft engines of all nations. Special chapters give detailed descriptions of leading commercial engines such as the Wright "Whirlwind" and "Cyclone"; the Pratt and Whitney "Wasp" and "Hornet," Anzani, Cirrus Mark 11 and 111; Packard, Curtiss and Caminez air and water-cooled types and their accessories.

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## THE 1929 NATIONAL AIR TOUR

(Continued from page 100)

Richmond, Va. ....	October 9....	Wednesday	night
Winston-Salem, N. C. ....	October 10....	Thursday	noon
Greenville, S. C. ....	October 10....	Thursday	night
Savannah, Ga. ....	October 11....	Friday	noon
Jacksonville, Fla. ....	October 11....	Friday	night
Macon, Ga. ....	October 12....	Saturday	noon
Atlanta, Ga. ....	October 12....	Saturday	night
Atlanta, Ga. ....	October 13....	Sunday	noon
Atlanta, Ga. ....	October 13....	Sunday	night
Nashville-Murfreesboro, Tenn. ....	October 14....	Monday	noon
Cincinnati, O. ....	October 14....	Monday	night
Louisville, Ky. ....	October 15....	Tuesday	noon
St. Louis, Mo. ....	October 15....	Tuesday	night
Springfield, Mo. ....	October 16....	Wednesday	noon
Wichita, Kan. ....	October 16....	Wednesday	night
St. Joseph, Mo. ....	October 17....	Thursday	noon
Des Moines, Ia. ....	October 17....	Thursday	night
Cedar Rapids, Ia. ....	October 18....	Friday	noon
St. Paul, Minn. ....	October 18....	Friday	night
Wausau, Wis. ....	October 19....	Saturday	noon
Milwaukee, Wis. ....	October 19....	Saturday	night
Moline, Ill. ....	October 20....	Sunday	noon
Chicago, Ill. ....	October 20....	Sunday	night
Kalamazoo, Mich. ....	October 21....	Monday	noon
Ford Airport, Mich. ....	October 21....	Monday	night

## Entry List

The company entering the ship is listed first in each case, followed by the name of the pilot, the type of plane, and the type of engine.

Great Lakes Aircraft Corp. ....	C. W. Meyers
2T-1 Biplane ....	American Cirrus
Great Lakes Aircraft Corp. ....	
2T-1 Biplane ....	American Cirrus
Moth Aircraft Corp. ....	A. Krapish & C. Jakway
Biplane ....	D. H. Gipsy
Travel Air Company. ....	Owen G. Harned
6000B Monoplane. ....	Wright R-975
Bellanca Aircraft Co. ....	Geo. W. Haldeman
CH Monoplane. ....	Wright J-6
Bellanca Aircraft Co. ....	
CH Monoplane. ....	Wright J-6
Bellanca Aircraft Co. ....	
CH Monoplane. ....	Wright J-6
Waco Aircraft Co. ....	
Biplane ....	
Command-Aire, Inc. ....	J. C. Cone
5-C-3 Biplane. ....	Challenger

Consolidated Aircraft Corp. ....	Leigh Wade
Monoplane ....	Hornet
Moth Aircraft Corp. ....	Miss F. Harrell
Biplane ....	Gipsy
Fairchild Airplane Mfg. Co. ....	
KR-34 Biplane. ....	Wright J-6
Ryan Aircraft Corp. ....	
Monoplane ....	Wright J-6
Corman Aircraft, Inc. ....	J. C. Kelley
Monoplane ....	Whirlwind (3)
Curtiss-Robertson Airplane Co. ....	D. R. Robertson
G-2 Cabin. ....	Wright J-6 225
Curtiss-Robertson Airplane Co. ....	D. G. Jackson
C-1 Cabin. ....	Curtiss Challenger 170
Curtiss-Robertson Airplane Co. ....	Forest O'Brine
J-1 Cabin. ....	Wright J-6 165
The Waco Airplane Co. ....	J. Livingston
Biplane ....	Wright J-6
Curtiss Aeroplane & Motor Co. ....	P. M. Boyd
Carrier Pigeon II. ....	Curtiss Conqueror
Curtiss Aeroplane & Motor Co. ....	K. E. Voelter
J-6 Thrush. ....	Whirlwind 275
Curtiss Aeroplane & Motor Co. ....	J. W. Crosswell
Condor ....	2 Curtiss Conquerors
Pitcairn Cierva Autogiro Co. ....	
C-19 Open. ....	Siddeley Genet
Sparton Aircraft. ....	Wm. Welborn
Biplane ....	
Lockheed Aircraft Corp. ....	Herbert Fahy
Vega ....	Wasp
Cessna Aircraft Co. ....	
Monoplane ....	Warner
Cessna Aircraft Co. ....	
DC-6 B Monoplane. ....	Wright J-6
Cessna Aircraft Co. ....	
DC-6 A Monoplane. ....	Wright J-6
Alexander Aircraft Co. ....	Errett Williams
Bullet Monoplane ....	
Alexander Aircraft Co. ....	Billy Williams
Bullet Monoplane ....	
Alexander Aircraft Co. ....	J. S. Charles
Bullet Monoplane ....	
E. M. Laird Airplane Co. ....	E. M. Laird
Biplane ....	Wright J-6
Fairchild Airplane Mfg. Co. ....	
71 Monoplane ....	Wasp
Fairchild Airplane Mfg. Co. ....	
KR-34 Biplane ....	Wright J-6

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Pilot ....	R. R. Blythe
Tour Manager ....	Douglas O-2 (U. S. Army)
Pilot ....	Lt. Wendell Brookley
Pilot ....	Captain Ray Collins
Tour Referee ....	Lockheed Air Express
Pilot ....	Captain Frank Hawks
Official Press ....	Ford Trimotor Firestone
Pilot ....	unassigned
Pilot ....	Munson T. Adams

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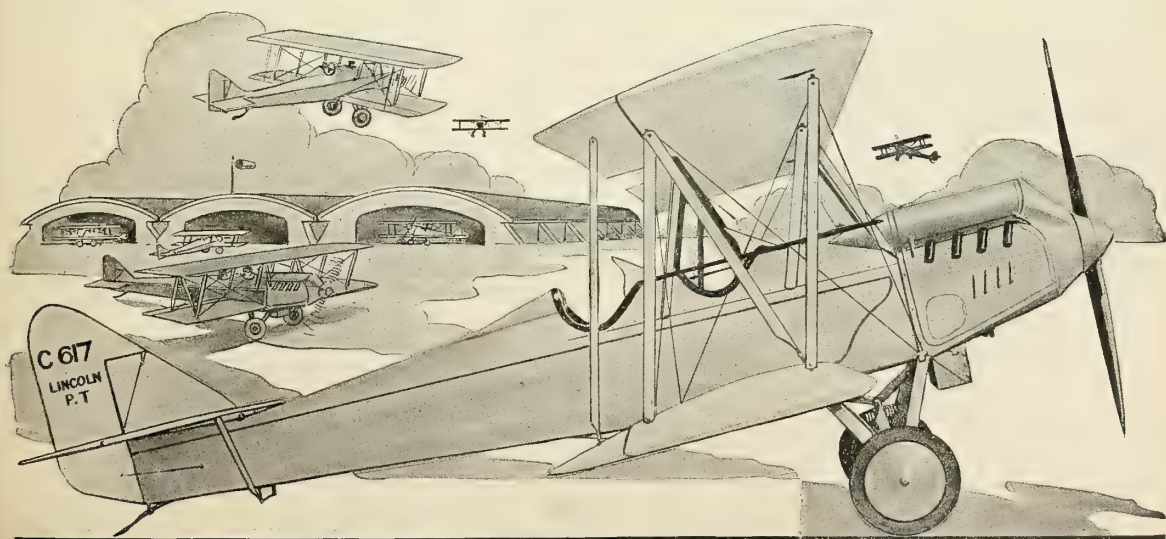
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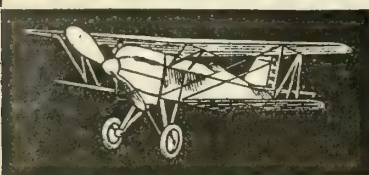
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## RESULTS OF GLIDER CONTESTS

(Continued from page 90)

Cincinnati Glider Club. Pilot, Carl Rupp flying same ship. Time: 40 seconds. Good.

Pioneer Gliding and Soaring Society. Pilot, Kuhn flying same ship. Time: 24 seconds. Fair.

Akron Glider Club. Pilot, L. B. Hutchinson flying same ship. Time: 18.5 seconds. Excellent.

Pilot William J. Perfield of the Titans also must be credited with a most liberal gesture when he withdrew his entry to assist the judges in getting started on the Famous Motored Pilots' Derby.

Events Number Four and Five were cancelled because of time limitations.

## Event Number Six

The famous motored pilots' derby.—The same rules applied here as in Number three except that the tow cables might be 600 feet long with unlimited speed. Duration was to count 50 per cent and landing on a mark 50 per cent. A flag was set for the mark similar to the practice in a dead stick landing contest for powered ships.

## Results:

Professor R. E. Franklin's well-known secondary ship was to be used by all contestants and was so used except as will be noted in this report, the exception having been caused by damage to the Franklin glider. The Franklin ship is an enclosed fuselage job of steel tubing with steel tubing reinforcements in the wings. It has a tapered wing.

Capt. Frank Hawks. Time: 1 minute, 45.5 seconds. Distance from flag: 14.25 yards. First.

Major Reed G. Landis. Flying the Paulus-Westerland PTG, the Franklin ship being out of commission. Time: 37 seconds. Distance from flag: 66.5 yards.

Lady Mary Heath. Time 22.5 seconds. Distance from flag: 80 yards.

Miss Amelia Earhart. Time: 21 seconds. Distance from flag: 233 yards. On the flight, Miss Earhart being somewhat confused by powered planes in the vicinity, banked steeply to the left around a pylon which was also being used as a mooring mast for airships. Getting too near the ropes, she dived away and made a hard landing on the nose of the ship, bending the steel tubing. She was not hurt. The lesson to be learned from this flight is that there is much more hazard to powered towing than to shock-cord launching and that inexperienced persons, even motored pilots, should not attempt it except under expert supervision, and then cautiously.

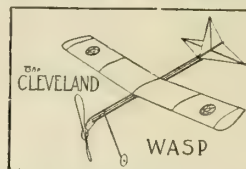
This marked the end of the formal contests.

Early in the afternoon, Lieut. Hayse D. Boyden, U. S. Marine Corps, made a demonstration flight, auto-towing, of 52 seconds. Captain Hawks flew again in the Paulus-Westerland ship for 47.5 seconds.

Late in the afternoon, Wallace Franklin again appeared over the airport, having been towed in a new secondary Franklin ship from Ypsilanti, Michigan, to Cleveland by Wallace Backus of Dublin, N. H., in a Gipsy-powered Moth in less than two hours.

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Cutting loose over the airport, at a time when the air was full of racing and stunt- ing ships, he did not delay his glide but made a sensational landing exactly in the line of gliders drawn up at one end of the field. So exact was his landing that his ship did not have to be moved an inch to be in line with the others. Both Franklin gliders are equipped with one landing wheel set in the skid and brakes.

Since many of the judges and most of the contestants, to say nothing of the man- ager of the N. G. A., were compelled to leave Cleveland either Wednesday night or Thursday morning, it was necessary for a committee of the judges under the chair- manship of Dr. Klemperer to take up im- mediately the question of the just and proper award of the prizes. This was done and the report was signed by Dr. Klemperer, Professor Altman and Professor Pawlowski as a recommendation to the manager of the National Air Races through the Director of Gliding Activities, Mr. Ross. The awards recommended and later confirmed are as follows:

The Cleveland *Plain Dealer*, first prize, a trophy: The Jackson Glider Club for first place in distance, shock-cord.

Halle Brothers, first prize, a trophy: The Jackson Glider Club for the best time auto- towing with return to point of departure.

Eddie Stinson, first prize, a trophy: The Cincinnati Glider Club, for winning two second places in distance, shock-cord and time auto-towing, under unusual handicaps.

The Cleveland *News*, first prize, a trophy: The Pioneer Gliding and Soaring Society for commendable contributions to primary gliding activities and good performance.

Cliff Henderson, first prize, a trophy: Frank Hawks, winner of Famous Motored Pilots, Derby.

AERO DIGEST, first prize, a trophy: The Titan Aircraft Club, University of Detroit. Second time and good performance, auto towing.

The Cleveland *Press*. Note: This prize with a corresponding second prize was not awarded by the judges but it was recom- mended that it be awarded for the past and pending demonstrations of aircraft towing. This award is covered in Mr. Ross's report, extracts from which follow:

AERO DIGEST, first prize, a trophy: Wal- lace Franklin for impressive performance.

The second prizes were all alike and were given by the National Air Race organiza- tion. They were awarded as follows:

Pioneer Gliding and Soaring Society for good showing on distance shock-cord.

Titan Aircraft Club of University of De- troit for good showing on time shock-cord.

E. D. Palmer of St. Joseph, Michigan, for good sportsmanship.

The Akron Glider Club for good sports- manship.

The Glider section of the University of Michigan for good sportsmanship.

Reed G. Landis: second place in Famous Motored Pilots' Derby.

Byrd Club of Sioux City, Iowa, for game efforts under heavy handicaps.

The Jackson Glider Club, for impressive performance.

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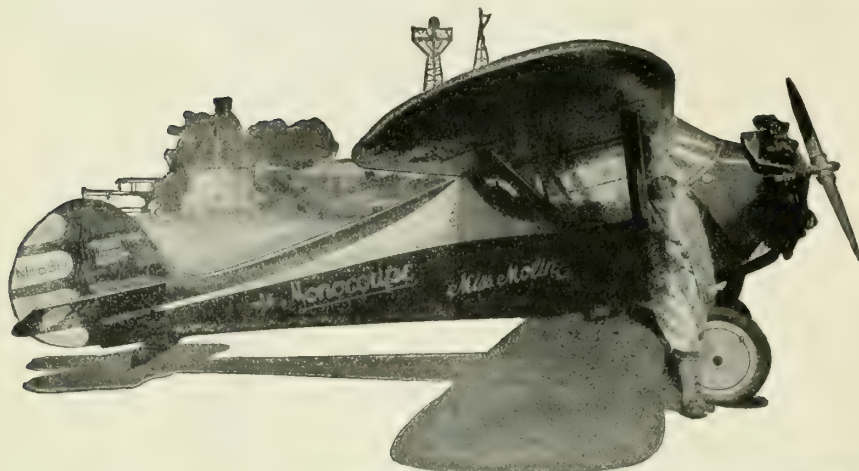
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Miss Phoebe Fairgrave Omlie with her prize-winning Monocoupe



Verne Roberts with his prize-winning Monocoupe "Little Sweetheart"

The Mono Aircraft career is conspicuous for its numerous victories. And now again—the inherent flying qualifications of Mono Aircraft planes have been proven beyond a doubt.

The first woman's National Air Derby was won by a *Monocoupe* piloted by Phoebe Fairgrave Omlie. Not only did she receive the "Standard Steel" trophy for first place in the light plane division but also the "Aerol Trophy" which was awarded for the most efficient performance of all planes in the flight. The course was from Santa Monica, Cal. to Cleveland, Ohio, a distance of 2723 miles, in 25 hours, 10 minutes and 36.5 seconds time elapsed. Miss Omlie also won the Women's 50 mile race.

The 50 mile closed course event for motors of 510 cubic inch displacement was won by Verne Roberts in his *Monocoupe* "Little Sweetheart". Second, fourth and fifth places were also won by *Monocoupes* in this race, conclusively proving the consistent superiority of Mono Aircraft. Competing against planes powered with engines of much greater horsepower, Verne Roberts' *Monocoupe* took second place and Stub Quinby's third in the 720 cubic inch class, and Verne Roberts placed third in the 800 cubic inch class.

On the flight from Philadelphia to Cleveland a *Monocoach* piloted by Ike Stewart took second place, as did the *Monosport* piloted by Leslie Bowman on the flight from Miami Beach to Cleveland.

Mono Aircraft planes are designed and engineered especially for the private flyer. Their popularity and approval in aeronautical circles is due to the superior advantages they offer in performance, safety, ease of control, comfort, speed and economy. They represent the highest performance and outstanding values in aviation today.

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Length .....	19 feet, 9 in.	Horsepower .....	60
Height .....	6 feet, 3 in.	Landing Speed .....	37 M.P.H.
Wing Area .....	143 sq. ft.	High Speed .....	98 M.P.H.
Weight—Empty .....	828 pounds	Cruising Speed .....	85 M.P.H.
Weight—Full Load .....	1350 pounds	Cruising Range .....	550 Miles
Place .....	2	Ceiling .....	12,000 feet
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Span .....	32 feet, 3 in.	Engine .....	Velie M 5
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Wing Area .....	143 sq. ft.	High Speed .....	92 M.P.H.
Weight—Empty .....	783 pounds	Cruising Speed .....	80 M.P.H.
Weight—Full Load .....	1288 pounds	Cruising Range .....	250 miles
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Height .....	7 ft. 1 in.	Landing Speed .....	42 M.P.H.
Wing Area .....	132.2 sq. ft.	High Speed .....	128 M.P.H.
Weight—Empty .....	1025 pounds	Cruising Speed .....	107 M.P.H.
Weight—Full Load .....	1650 pounds	Cruising Range .....	550 Miles
Place .....	2	Ceiling .....	20,000 feet
Fuel Capacity .....	32 gal.	Climb, per minute .....	1,100 feet

Price \$6,350, Warner Engine; \$5,750, Kinner K5 Engine

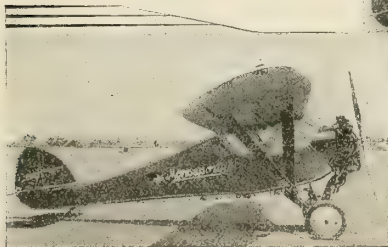
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Wing Area .....	222 sq. ft.	High Speed .....	125 M.P.H.
Weight—Empty .....	1919 pounds	Cruising Speed .....	110 M.P.H.
Weight—Full Load .....	3092 pounds	Cruising Range .....	650 Miles
Place .....	4	Ceiling .....	22,000 feet
Fuel Capacity .....	63 gal.	Climb, per minute .....	1,200 feet

Price \$7,950—Flyaway Moline, Ill.

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# FOREIGN NEWS IN BRIEF

Compiled from reports from AERO DIGEST'S correspondents, the Aeronautics Trade Division, United States Bureau of Foreign and Domestic Commerce

## ENGLAND

A PROJECT to link the British West Indies, British Guiana, Venezuela and Canada by a seaplane fleet, competing with American airlines in South American traffic, has been announced by H. W. Garraway and George G. Black, London agents of the Atlantic Airways, Ltd. The plans call for three lines of seaplane service: From Trinidad to British Guiana and Trinidad to the Venezuelan oil fields; Trinidad to the Barbadoes and Trinidad to Jamaica by way of the Leeward Islands; and an extension of the service from Jamaica to Montreal by way of the Bahamas and Bermuda.

Negotiations are progressing with the British government, the Colonial government and the Venezuelan government with the object of opening the first section of the service early in 1930, necessitating a subsidy of \$150,000.

A TRIMOTOR Argosy airplane loaded to its full capacity of 5,000 pounds, and with fuel for 4 hours, was flight-tested recently for performance under partial power conditions by Imperial Airways. The airplane left the ground in 11 seconds and climbed to a height of between 2,000 and 3,000 feet. Each of the Armstrong Siddeley engines was then switched off in turn for a period of 10 minutes and the airplane flown on the two remaining units. It was found that a height of over 2,000 feet could be maintained with any one engine stopped while flying at an air speed of between 75 and 80 miles an hour. The airplane was equipped with the newest type of 460-510 horsepower Jaguar engines, with reduction gear.

SIX tons of air mail has been carried between England and India during the first three months of operation on the through England to India line. On the twelve flights to India, 4,700 pounds of mail was carried, and on the return flights 7,300 pounds of air mail was carried.

## GERMANY

EDWIN P. A. HEINZE

THE results of the Grand European Flying Competition that finished on August 15th at Paris after the competing planes had flown a distance of 3,755 miles, have been very gratifying to Germany. The plane that was awarded the highest number of points, irrespective of class, was a German B. F. W. with a 70-horsepower Siemens radial engine, and weighing less than 617 pounds.

There were two categories of machines admitted for this competition, the first for machines weighing up to 881 pounds and the second for those under 617 pounds. This result proved the quality of what may be called ultra-lightweight machines. Of 44



The Prince of Wales and Flt. Lt. Don, his pilot and flying instructor

machines that had started, 12 dropped out en route, including five German planes. But of the remaining 15 German machines, 3 of them, with non-German pilots, completed the tour.

From the German point of view this competition was especially interesting as two new developments, one a plane, the other a motor, were for the first time publicly tested. The plane was the all-metal Junkers Junior, and the new motor a small B. M. W., developing 65 horsepower. This new motor was installed in a Klemm plane piloted by Poss, who won third place in the category of small planes. The new Junkers planes performed favorably though they only came in 8th and 11th respectively in the heavier class.

The new B. M. W. engine is destined to fill a gap in the range of German motors. Hitherto German aircraft makers requiring engines of between 40 and 70 horsepower had no choice but to purchase either British, Italian or French products. Thus the B. M. W. motor should have a good market.

IN April, 1930, the Aero-Arctic Association plans a Zeppelin Expedition to the Arctic regions. The trip is planned solely for scientific researches, and will take between 18 and 25 days to accomplish, during which time 11,000 miles will be covered. There will be two main bases, each with a mooring mast; the one in the north of Norway at Tromsø, and the other at Fairbanks, Alaska. The leader of the expedition will be Frerhøj Nansen.

THE Ford plane, which was at the Olympia Show in London, has made a demonstration flight through Europe, remaining eleven days in Germany. Parker John Vanzandt, foreign sales manager of the Ford airplane department, was in charge

of the trip, the ship being piloted by Leroy Manning, chief pilot of the Ford company. The Ford plane was inspected and occasionally flown by numerous leading experts, both in Government and private service. A visit was paid to the Junkers works and a tour was made of Danzig, the Baltic states and Russia. The German Airways Seaport at Travemünde was visited, and the newly commissioned Rohrbach-Romar flying boat was inspected. A trip was also made to Friedrichshafen, the home of the Zeppelin and of the Dornier flying boat factory.

THE Junkers Company has published its annual report, according to which the company suffered a loss of 149,710 marks (\$35,650) in the 1927-1928 year. This is being covered by the profit carried forward from the previous year. In view of the increased production and the large sums invested in the building of the new giant ship, the J. 38, this result is considered good. The company has been able to carry through all transactions without taking recourse to bank credits.

THE Junkers Diesel airplane engine has stood its first cross country test. In July constant flying tests were carried out over the airport of the works at Dessau in the presence of delegates of the official Aeronautical Test Board. During one flight the machine remained in the air for 8 hours, and it was officially ascertained that the fuel consumption amounted to 180 grams per horsepower as compared to the 230 to 240 grams used by normal carburetor gasoline engines. This means that the fuel consumption on the Junkers Diesel engine only costs one-fifth that of an equally powerful gasoline power plant as the oil used is much cheaper. The cross country flight made by the engine was from Dessau to Cologne, the distance being flown in 3 hours.

In regard to the tests carried out by Junkers with rockets as a means of securing greater acceleration when starting with a heavy load, further particulars have been announced. A single-engined low wing monoplane was used. It was equipped with floats and tested on the river Elbe. Under each wing it had three rocket tubes each 4 inches in diameter. The ship was started in the usual manner with the motor, which was then assisted by the rockets which were ignited electrically from the pilot's seat. The result in speed acceleration proved unsatisfactory and much smoke was developed; nevertheless, the company is continuing its experiments in this direction.

CONSTRUCTION work at the Luebeck Travemuende, Germany, seaplane base has been practically completed. The landing field for land planes has been enlarged by

(Continued on next page)

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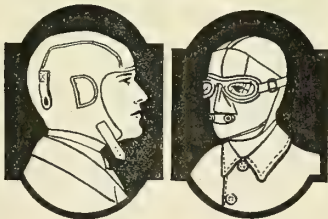
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sand from the River Wiek, and the entire area has been drained. The drainage system, 21 miles in length, is embedded in cinders to prevent the clogging of the pipes by mud. A steady slope to the river permits of quick drying after heavy rains or rapid melting of snow.

In the seaplane port the starting and landing ways have been completed, the starting runway being lengthened by 96 feet and broadened by 48 feet. It extends into the water up to a depth of 13 feet permitting the largest seaplanes to be hauled ashore. There is a total area of 2,700,000 square feet of cemented area for land planes. There are two curved piers extending into the Wiek, over which the wings of a seaplane on the water may come. Repairs thus may be made without hauling the seaplane into the repair shop ashore.

Another facility is a small tank boat provided by the fuel contractor of the airport and a floating repair shop is used to make minor repairs and adjustments to seaplanes on the water. The Luebeck Travemuende airport is a base for the Deutsche Luft Hansa seaplane and is used also as a test station by the Rohrbach Airplane Manufacturing Company. Passengers from Berlin to Scandinavian cities are transferred from land planes to seaplanes at this port during the summer months.

## FRANCE

THE Ecole Nationale Supérieure de l'Aéronautique, a French governmental school, will open its session in November, 1930. Foreign students will be admitted for study at the school under the following conditions: Foreigners not employed by their Government will have to take an examination for admission at Paris in June, 1930. The program for this examination will be the same as the one for the admission to the Ecole Polytechnique in Paris. Those passing this examination will be admitted to a preliminary course of studies of one year, after which they will be admitted to the regular two year course. Foreigners in the employ of their Government will be ad-

mitted directly to the two year course, without the preliminary year of studies, upon official demand by their Government.

RECORD figures were established by various airlines plying to and from Le Bourget Airport, Paris, France, August 31, according to the official airport statistics. These figures show twenty-six planes left for other points carrying 162 passengers, 16,940 pounds of freight and 75 pounds of mail, while twenty-six planes which arrived brought 188 passengers, 13,460 pounds of freight and 915 pounds of mail including mail from the Far East.

The total of 350 passengers has never been surpassed in the history of the airport in one day. Of these 177 traveled on Paris-London lines.

## CANADA

[JAMES MONTAGUES]

### Canada's National Air Show and Races

AIR races were held in conjunction with Canada's National Air Show held at Toronto coincidentally with the National Air Races at Cleveland. The first of these were all-Canadian events, open to private and commercial planes. The races were from Toronto to Cleveland and return. First prize for club and private planes in this race went to Ken White of the Hamilton Air Club, who was presented with the bronze plaque and prize money by City Manager W. R. Hopkins of Cleveland. Carter Guest of the Toronto Flying Club, G. Norman Irwin of Whitby, and T. F. Williams of the Toronto Flying Club won second, third and fourth places respectively.

The race for commercial planes was won by Herbert St. Martin of Peterborough. Ed Johnson and Capt. Crang, both of Toronto, came second and third.

In a flying club race from St. Catharines, Ontario, to Toronto, Leigh Capreol, test pilot for the De Havilland Company of Canada, came first, with Pilot Miller and Norman Irwin second and third respectively.

On September 4th an air race was staged to Toronto from Cleveland, fourteen Ameri-

can planes taking part and finishing. The race was won by P. Morgan Hackman, with W. T. Bachus second. Races from St. Catharines to Toronto were also held on that day, in which Carter Guest of the Toronto Flying Club came in first.

On September 5, the army planes from Selfridge Field, under Major Ralph Royce, and from Camp Borden, under Major McEwen, gave an aerial drill and stunt flying for Toronto. Single-motored, twin-motored and tri-motored planes visited Toronto as well as two blimps from Akron, Ohio.

Prizes of \$50,000 have been promised by C. O. Stillman of the Imperial Oil Company for a Canadian airplane speed race in 1930. The race will be international but held entirely in Canada, with the finishing point at either Toronto or Montreal.

THE first daily express service from Canada, operating between Toronto, Hamilton, London and Windsor was inaugurated recently by the Canadian Pacific Express Company. A Fairchild cabin monoplane, piloted by Captain R. H. Bibby, took off from Canadian Airways field at Weston. The schedule of the new line is as follows: leave Toronto 1:45, arrive Hamilton 2:15; leave Hamilton 2:30, arrive London 3:15; leave London 3:30, arrive Windsor 4:30. On the return journey the plane will leave Windsor the next morning at 6:35, arrive London 7:40; leave London 7:50; arrive Hamilton 8:30; leave Hamilton 8:40; arrive Toronto 9:00.

## WESTERN CANADA

[E. D. McCABE]

CONNIE JOHANESSON, formerly of the Royal Air Force, has taken over the joint duties of instructor and business manager of the Winnipeg Flying Club.

Mr. Johanesson, a war time pilot, has over 600 hours of flying time. He received his training at the British Flying School in Egypt, and served two years as an instructor.

THE Western Canada air mail service is practically complete, awaiting only the lighting to be placed on the intermediate fields. This work is now being done between Winnipeg and Regina. The contractors, Western Canada Airways, are now taking delivery of eight new special Fokker mail planes. The main route will connect Winnipeg, Regina, Moose Jaw, Calgary and Canmore.

THE Postmaster General has just announced a new air mail service between Ft. Murray, Alta., in the Peace River country, and Aklavik, North West Territories, near the mouth of the MacKenzie River on the Arctic Ocean. The service will begin in November. W. L. Brintnell of the Western Canada Airways, who took government officials over the route, made a non-stop flight of 860 miles from Aklavik to Dawson City, Alaska, in 6 hours 45 minutes in a Fokker Super Universal.

(Continued on next page)



Maj. Ralph Royce of Selfridge Field, Capt. Earl Hand, president of the Toronto Flying Club, and Capt. C. McEwen of Camp Borden, at Canada's National Air Races

# "The One Essential Book on Aeronautics"



C. N. MONTEITH

AT last the famous book the Army Air Corps prepared for the use of West Point cadets, and that required such wire pulling to obtain for private use, has been made available for all. The *Ronald Aeronautic Series* now includes as one of its twenty-two volumes **Simple Aerodynamics and the Airplane**, by Charles N. Monteith, formerly Lieutenant, Air Corps, U. S. Army, and now chief engineer of the Boeing Airplane Company.

The book has been completely rewritten and revised by Colonel C. C. Carter of the U. S. Military Academy, West Point, and reissued as the third edition of this standard text on basic aeronautics.

The material in this new book has been tested and retested until the final form reaches the highest degree of excellence. So broad in scope has it been made that novice and expert alike can study it to advantage. That for basic, foundation instruction it is unequalled is evidenced by the number and rank of the schools that

have recently selected this new revised edition for class use. Among the latest, to mention but a few, are:

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Iowa State College  
Purdue University  
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**Simple Aerodynamics and the Airplane** is equally well suited to the home-study needs of the individual not associated with any school. The presentation is not highly technical. More than 200 diagrams, sketches, drawings and photos are used to clarify all points and make the text easily understood by those working alone. *U. S. Air Services* said of this manual in a recent issue, "As a text for student or engineer this book is hard to improve upon."

The subjects covered include a full discussion of airplanes; characteristics and types of airfoils; explanations of lift and drag; center of pressure; plotting of coefficients and characteristic curves; distribution of forces; selection of airfoils; rate of climb; landing speeds; combining airfoils; parasite resistance; characteristics of engines; discussion of component parts of an airplane; stability considerations and its attainment; control surfaces; the propeller; airplane performances; dynamic loads; maneuverability and controllability; structural considerations; wind tunnels; discussion of airplane types for specific performance; methods and instruments for navigation of aircraft; airplane accessories; parachutes; radio; photography, etc., etc. **418 pages; 211 illustrations; price \$4.50**

## Other Practical Books on Aeronautics

### Elements of Aviation

by Colonel V. E. Clark, formerly Chief Aeronautical Engineer, U. S. Army. 193 pages, 24 illustrations, price \$3.00

Will give you a clear understanding of the fundamental reasons why an airplane flies, why it is stable or unstable, controllable or uncontrollable in various attitudes and conditions—in short, "why an airplane does what it does." Its explanations are simple but absolutely authentic. It will help the beginner learn more rapidly and to become a better and safer pilot. The veteran flyer will find in its pages an explanation of many questions regarding the behavior of a plane that may have bothered him. The flying instructor will find here simple but thorough answers to many of the puzzling questions that his students ask.

### Practical Flying

by Major B. O. Jones, Air Corps, U. S. Army. 210 pages, 6 illustrations, price \$3.00

Experienced airmen enthusiastically endorse this new training manual for airplane pilots by a veteran Army flyer and instructor—they say it will save many crashes and lives. It describes all the parts of a plane, instruments, etc.; maneuvers in the air; and explains technical expressions and slang terms. Covers practical subjects like: the most useful instruments for each class of flying, particularly "blind" flying; why a magnetic compass spins during fog flying; "dead stick" landings; causes of crashes during take-offs and turns for landings; how to recognize stalls in time and how to get out of them easily; suggestions for progressive lessons right up to the license flight, etc., etc.

### Aeronautical Meteorology

by Willis Ray Gregg, Senior Meteorologist in Charge of Aerological Division, United States Weather Bureau. 144 pages, 44 illustrations, price \$2.50

Furnishes information needed to understand weather maps at a glance and for applying local observations in forecasting prospective flying conditions. Covers weather forecasting from clouds; average height of clouds of each class; variation in direction and velocity of winds with change of altitude; frequency of winds from each direction at various altitudes; characteristics and dimensions of thunderstorms; general circulation of the atmosphere; visibility, instruments and methods of observation; cyclones and anti-cyclones, etc.

### Engineering Aerodynamics

by Lieut. Walter S. Diehl, (C.C.) U. S. N.; Scientific Section of Bureau of Aeronautics; Member of Aerodynamic Sub-committee, N. A. C. A. 288 pages, 159 illustrations, price \$7.00

Contains a large amount of selected new data in the form of working diagrams and equations supplemented by

detailed instructions for use. Supplies a carefully selected theoretical treatment, starting with the fundamental laws of hydrodynamics and leading up to the modern theories of lift and drag. Explains circulation, vortex theory, induced drag, etc. Theoretical equations of motion are developed for many problems in rectilinear and curved flight. Gives data on standard wing sections and explains how a section may be selected for a particular purpose; parasite drag data for a wide variety of shapes; methods for conducting wind-tunnel tests and interpreting test data; shows how flight tests are made and reduction of observed data to standard conditions, etc.

### Airplane Stress Analysis

by Alexander Klein, Prof. of Aeronautical Engrg., Daniel Guggenheim School of Aeronautics, N. Y. University. 277 pages, 105 illustrations, price \$7.00

Shows, step by step, how to make all the calculations in the airplane stress analysis required by the Department of Commerce. Each point is explained with the utmost clearness and simplicity; advanced mathematics has been avoided so far as possible. Explains the principles of applied mechanics involved and develops the formulas that furnish the foundation for stress calculations. Takes as an illustration an airplane of average characteristics and gives full examples of all the computations required. Supplies in concise, easily usable form, all the data on materials of airplane construction to which the calculator must frequently refer.

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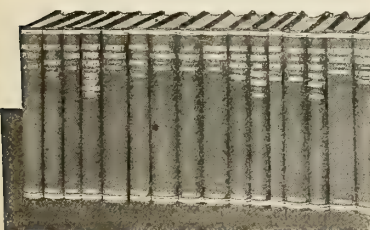
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Personnel of the Niagara Falls Division of Sky View Lines, Ltd.

**T**HE Niagara Falls division of Sky View Lines, Limited, has been making daily sightseeing trips over Niagara Falls during the summer, averaging about 100 passengers per day. Pilots of the division include Bob Thiebert, chief mechanic; Art Allman, pilot; Oscar McLeod, president; Jerry Blackburn, purser; and Harry Hublitz, chief pilot.

**T**HE Great Western Airways, Limited, of Canada, is an operating company formed recently by the merger of three airline operating companies for the purpose of competing for air mail contracts to the Prairie Provinces. Commercial Airways, Ltd., of Regina, Great Western Airways, Ltd., of Calgary, and Commercial Airways, Ltd., of Edmonton, participated in the merger. J. H. Tudhope, supervisor of airports and airways for the Dominion Government, will be general manager of the firm.

## MEXICO

[MONTE HURST]

**L**IEUT. JACINTO BONDANZA, one of the army air force officers of San Salvador, has gone to California to make a two years' study of aviation. He is one of the eight pilots of the Salvador army air force, and expects to make an extensive study of commercial and military flying, as well as of U. S. airports.

**A**T the sub-station in the Mexican aeronautics department office in Mexico City successful tests have been conducted on communication between airplanes and the office. Messages were received and sent with clarity, and it is proposed to control all airplane service through means of the new central radio station that has been constructed.

**A**NEW air line was started recently between Tijuana and Suchiat, Mexico. It is operated by the Cia. Latino-Americana de Transportes Aereos. Three Ryan monoplanes are now being used and Buhrs have also been ordered. Five more Ryans will also be delivered at some time in the near future. Daniel E. Ellis is president of the new line and holder of the original concession to operate.

**G**RAVEL topping has been placed on the road leading from Tampico to the city's airport, four and a half kilometers northwest of the city. The grubbing of both

runways at the field is finished, and grading of the landing runs has started. The equipment of the old field will not be moved to the new location until the rainy season is past. The Aviation company has purchased a truck to transport passengers to and from the city to the field.

**T**HE Cia. Mexicana de Aviacion has made arrangements to improve the airport in Brownsville, Texas, in order that the landing field may accommodate the company's service for at least the next five years. A. W. Naylor is in charge of the project. Two more hangars will be constructed and another runway will be built. The company will then have four hangars and three runways at the airport. More drain ditches will be built. The field is already equipped with lights for night flying and additional beacon lights and boundary lights will be installed. The Compania Mexicana de Aviacion now operates a regular air express service between the following cities: Arriga, Brownsville, Campeche, Ciudad del Carmen, Matamoras, Tampico, Merida, Mexico City, Minatitlan, San Jeronimo, Tapachula, Tuxpan, Villahermosa and Veracruz. Offices of the company are located in the lobby of the Hotel Imperial in Tampico. Packages are accepted up to 12 kilograms in weight and two thousand dollars in value. Shipments are made from company offices or flying fields.

**I**NAUGURATION of the new flying field at Cuautla took place on July 28th. Three planes took part in the opening of the new field, piloted by Fritz Beiler, Armando Cosio, and Senors Pulido and Algara. Gov. Ambrosio Puente, J. R. Bustamante, mayor of Cuautla, and civil and military officials welcomed the flyers and took part in the celebration.

**T**HE Matamoras and Mazatlan line, a subsidiary of the Transcontinental Air Transport Corporation, has changed its schedule and now offers a two-day service, using single-motored cabin monoplanes. Stops are being made at Torreon, Monterrey and Durango. Repair work on the Mazatlan field has been finished. While the work was going on planes used Rosario Field.

**T**HE Asociacion Mexicana de Aeronautics has been formed in Mexico City by a group of those interested in aviation and,

particularly, gliders. The Association has asked for plans for the building of gliders from the National Glider Association, and an experienced instructor has been engaged. All members of the Association intend to learn to fly gliders and organize clubs throughout the Republic. Much interest has been aroused by the members.

**T**HE city of Los Mochis, Mexico, in the state of Sinaloa, is constructing a modern airport 1½ miles from the city on the main state road in the Fuerte River valley. The airport is bordered on the south and west by open fields, on the north by low brush, and on the east by a large race track. The main runway lies approximately north and south and is 6,000 by 700 feet and level. At each end of the main runway, there are two other runways, 3,500 by 300 feet. The one at the northern end runs northwest. The one at the southern end runs southwest by west.

There is in project the construction of a hangar of suitable size to accommodate a Ford plane. The night lighting equipment will be Westinghouse floodlights and boundary lights. A beacon will be placed on a nearby hill.

**A**N air week will be held in Mexico under the auspices of the Mexican Association of Aeronautics, for educational purposes from Nov. 12-18, 1929. Exhibits of Mexican civil and military aeronautic activities will be prominent attractions and extensive arrangements are being made. American manufacturers of airplanes and aeronautic products will be invited to take part and the preparations will include facilities for exhibitors.

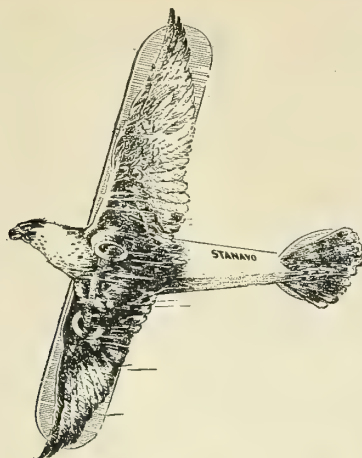
**MAJOR BERNARD A. LAW**, former Army aviator has been appointed superintendent of operations of the Corporacion Aeronautica de Transportes system in Mexico. This corporation operates over 6,000 miles of airlines as follows: Brownsville, Texas, to Mazatlan, Mexico; Mexico City to El Paso, Texas; and Chihuahua to Nogales, Arizona. Lockheed planes are used, and the saving in time over train service ranges from two to five days.

## SYRIA

France-Syria Airline Started

**T**HE Union Air Lines of the Orient, Inc., under the direction of Commandant Car-bonier, head of the French Engineering School at Beirut, has inaugurated a mail and passenger flying boat service between Marseilles and Beirut. The schedule operates weekly with stops at Naples, Corfu, Athens, and Turkey. The line is planned to extend into Indo China.

Beirut lies at the foot of Mt. Lebanon on a small harbor, and landing conditions are difficult. To overcome this obstacle, the Physics Department of the American University of Beirut has installed an electrically controlled anemometer which registers direction and velocity of wind. This, with other general observations, is supplied to the bureau in Beirut and transmitted by wireless to the approaching planes.



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## WORLD FLIGHTS MARK PROGRESS

(Continued from page 52)

and the United States Navy, secured a relief plane and continued, only to crack up in a fog on the coast of the Bering Sea. The Italian flight finished the day we flew from Iceland to Greenland.

In quick succession we flew over Roumania, Hungary, Austria and arrived in Paris July 14th, Bastille Day, and flew over the Arc de Triomphe, dipping in salute to the Unknown Soldier. Tens of thousands cheered us at Le Bourget, the same field where Colonel Lindbergh was to achieve fame three years later.

The next flight was across the English Channel to London. At Brough we changed to pontoons again, after having flown from Calcutta, India, without them. On the trip from Seattle to Calcutta we had used pontoons. Incidentally, the flight was the longest ever made up to that time by any seaplanes.

After the pontoons were added at Brough we were prepared for the great adventure. Ahead lay the most dangerous lap of our journey. Airplanes had never been to Iceland and Greenland. Supply ships had encountered great difficulty in getting through the ice to deposit supplies. Few places on the planet are as hard to reach as that ice cap called Greenland.

On July 30 the three remaining planes, the *Chicago*, the *Boston* and the *New Orleans*, headed out over the north Atlantic towards Iceland. Very heavy fog was encountered, and we flew blind most of the way on this nerve-racking trip. I got through with the *New Orleans*. The *Chicago* and the *Boston* had turned back, but tried again the next morning. Our good friends Lieutenant Wade and Sergeant Ogden, in their trusty plane the *Boston*, had to make a forced landing between Scotland and the Faroe Islands, because of an oil pump failure, and were rescued by the Navy. The *Chicago* joined the *New Orleans* at Hornsfjord, Iceland.

The *Chicago* and the *New Orleans* were faced with an 835-mile flight over the Arctic ice pack, a trip more dangerous than an attempt to fly across the Atlantic in one leap from England. We were entirely off the line of steamship travel, in the region of fogs and gales, and on the edge of the Arctic. But it was our only chance to complete the flight. The *Chicago* and the *New Orleans* decided to risk it. For the first 500 miles we flew through a perfect sky, then plunged into fog and rain. Seventy-five miles out of Greenland we struck the first ice floes. Approaching the coast we were playing tag and leap frog with icebergs, which seemed to jump out of the fog.

The two planes became separated. Finally we reached the mainland, but could not land. Our eyes ached as we sought to peer through the fog. Finally, when time and charts indicated we were over our scheduled stop in Greenland, we found an opening in the fog and landed in the sea beside a Danish destroyer. Thus we completed the first flight ever made between Iceland and Greenland. We had remained in the air for eleven hours of intensely nervous tension during this long flight through fog and storm, and when we reached Fredricksdal, we had been without sleep for forty-two hours.

Success was just ahead, for across Davis Strait lay America. A swift flight down the coast of Newfoundland, then Pictou, Nova Scotia, where Wade and Ogden, who had arrived by destroyer after being rescued off the coast of Scotland, joined us with the *Boston*, a sister ship of the one destroyed. Once again the six fliers were together.

Our arrival at Boston was the beginning of a series of

demonstrations that continued across the nation until we reached Seattle, where the flight was officially ended. From Seattle to return to Seattle we had flown 26,345 miles in a total of 363 hours and seven minutes, and our average rate of speed in flight had been 72½ miles an hour.

MAGELLAN'S journey around the world opened up the sea routes. The first 'round-the-world flight is the forerunner of vast aerial enterprises and of a commerce which will bring the nations still closer. The airplane five years ago was a novelty in many cities, although some nations, particularly Siam, India, Mesopotamia, Turkey and European countries, were quite familiar with the new mechanical bird of the air, and were deeply interested in aviation.

I recall that when we left Le Bourget aerodrome at Paris, for London, over the English Channel, planes were leaving for London, Brussels, Amsterdam, Lyons, Marseilles, as punctually as the *Twentieth Century* or *Broadway Limited*, while other passengers were having their tickets punched for distant points with the same bored expressions you see on the faces of commuters. It took the world fliers three hours and seven minutes to fly from Paris to London. Today that flight is daily routine for hundreds of passengers. All the passengers on two transports which escorted us over the Channel were Americans, who must have felt sorry for travelers in the wallowing steamers below. Within a few years these steamers will be as obsolete as the old-time galleon.

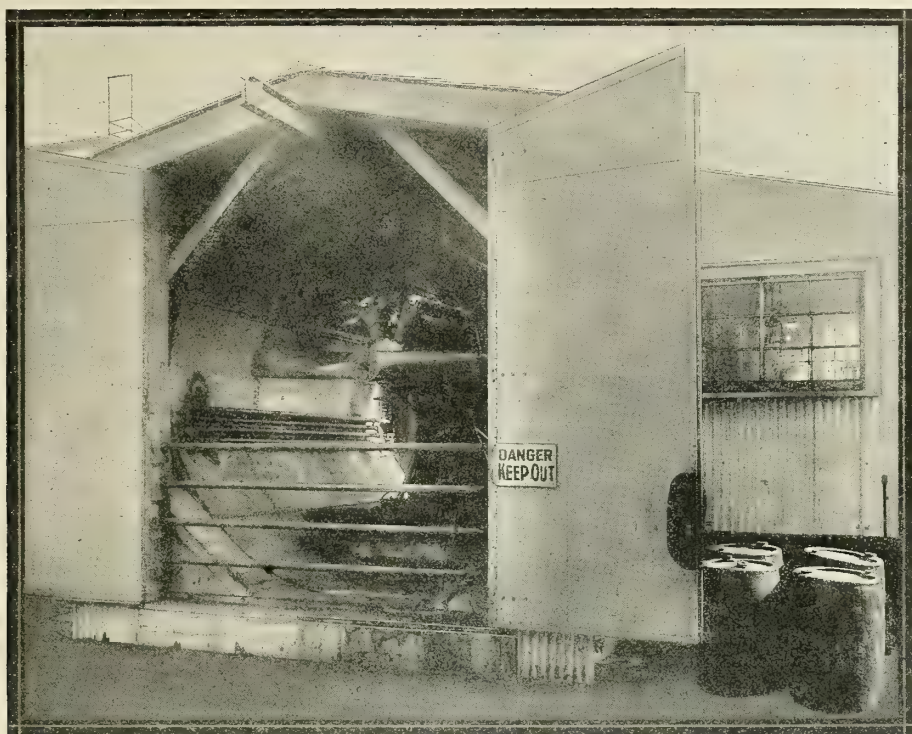
I have been told that I am the only person who has ever circumnavigated the globe employing two forms of transport, and the only person who has sailed twice around the world before the mast on square rigged ships, and then flown over the same route. As we clipped off mile after mile and hour after hour over the sea between Japan and China, where I once sailed on a windjammer, I thought of the difference between a ship that takes from one to two years to sail around the world and an air cruiser like the *New Orleans*, the best of its kind in those days, capable of making a circuit of the globe in less than two weeks' time. In a little more than ten years I have not only seen this miracle, but have taken part in it.

I recall that as we flew on toward China, my engine was so smooth the ship seemed to be flying itself. I dropped into a reverie. I seemed to see dozens of giant planes passing me in the sky, with passengers making week-end trips between Shanghai and our Pacific Coast, just as they now do between Paris and London. I visioned the airplane as an agency which will bring peoples and races of the world into such intimate contact that they will be no more inclined to wage wars than the people of Oregon feel like fighting the inhabitants of Florida.

The airplane will replace other forms of transport. At Aleppo we looked down on a caravan of camels. When the airplane comes into its own, what will happen to the most picturesque of men, the desert Arab? Journeys that now take more than two months can be made by airplane between sunrise and sunset. The day of desert raids will be over. The Sheikh with his pursuit planes will be able to wipe out his enemy within a few minutes. The British, in keeping control of India, have found the airplane an extremely effective weapon. They are developing a line from London to Delhi, India.

In 1926 I made a trip as a passenger in a flying boat across the Baltic Sea between Sweden and Germany. We

(Continued on next page)



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(Continued from preceding page)

flew close to the water at more than 100 miles an hour, passing the various surface ships, and again I could not help but think back twenty-two years, when as a youth of 16 I started out to see the world as a sailor. At that time if we sailors had looked up and seen a flying boat similar to the one I was riding in, we would have said there was no such thing, that it was not possible. Yet in 1926 boat passengers regard the flying boat as commonplace. Such is progress.

When we flew around the world five years ago, the United States, as well as other countries, had allowed commercial aviation to lag. A few air mail routes represented the bulk of commercial air transport. Today the picture is changing rapidly. Since the world flight I have seen the daily mileage of mail, express and passenger planes in the United States jump from a few thousand to 80,000 miles daily. An air network is being built which will soon connect every major city of the United States.

Planes which were only dreamed of five years ago are now in actual operation transporting twelve to eighteen passengers who ride as comfortably as in an observation car. American cities are spending \$200,000,000 this year improving airports. Communities which formerly contested for rail lines now seek airlines. We have only begun in the development of aviation, to which our 'round-the-world flight gave a stimulus because it pointed out the possibilities of the airplane.

As a practical-minded aeronautical man, I can vision planes carrying fifty or more passengers. Germany, which, when we were there five years ago, had an ambitious aeronautical program, has just announced a flying boat driven by twelve engines, capable of carrying 100 passengers and a crew of ten. It is a virtual ocean liner having three luxurious cabins with Pullman sleeping arrangements, kitchen, baggage rooms, etc. It is reported to be capable of carrying between twenty and twenty-five tons, comprising a total weight of approximately fifty tons.

Pullman service will be established for overnight runs, thus enabling people to travel from cities as distant as 1,200 miles without the loss of any business hours. Refueling in the air will be utilized in some cases to curtail time lost in landing. Limited service, as distinguished from local service, will give higher speed and fewer landings to the through traveler. Smaller, high speed planes flying 200 miles an hour will be used for handling valuable mail and express, with time as a vital factor.

All passenger transports will have radiophone and directive radio beacon service, thus placing planes in closer contact with despatching officers than are engineers on trains.

## INTERNATIONAL LIGHT PLANE CONTEST

(Continued from page 85)

place was awarded to Captain Broad, who scored a total of 135.25 points with his Gipsy Moth. For the *qualités pratiques* during the tests at Orly he received 26.25 points. Third place was awarded to Lord Carberry, whose Raab-Katzenstein low-wing monoplane scored a total of 131 points. His speed was the greatest on the tour, being one kilometer an hour faster than Captain Broad in his Moth. Following the first three planes in order came the Klemm-Salmson of Lusser with 128.25 points, Guazetti in a Romeo-Fiat with 127.25, Von Dungen in a B. F. W. with 126.75, Kleps in an Avia with 126.50, Castaldo in a Romeo scoring 124.25, Gelmetti in another Romeo scoring 122

points, and Miss Spooner in a Gipsy Moth scoring 121.5. Totaling up, German planes took 13 places among the 31 which actually finished. The two English planes finished 2nd and 10th. Eight Italian planes finished, as well as four French and one each of Czechoslovakian and Belgian.

The results of this year's International Challenge are interesting in comparison with those of last year. A year ago there were twenty-five entries, and instead of covering Europe, the tour only extended around the boundaries of France. Lusser in a Klemm-Salmson won the highest total of points, with second place going to Percival in an Avro Avian, third place to Captain Broad in his Moth, fourth place to Lady Heath in an Avro Avian, and fifth place to Finat in a Caudron. The Tour of Europe this year covered a distance of 3,907 miles and included stops at 24 large European cities in thirteen nations.

This *International Challenge de Tourisme* has been an annual event in Europe for four years and has now assumed considerable importance as a great demonstration of the possibilities of light planes. It is organized by the Aéro Club de France, in conjunction with the Association Française Aérienne and various aeronautical organizations in the countries now included in the Tour of Europe. Europeans who follow developments of light aircraft in the United States would undoubtedly be greatly interested in watching American planes compete with this large field of European craft in the future.

## A EUROPEAN'S IMPRESSIONS

(Continued from page 75)

practical new idea must be utilized if one is to stay in business; in Europe, on the other hand, tradition and precedence rule. In the United States, if one concern uses the air mail, others in the same line must do so also in order to compete on an equal basis; whereas in Europe, the large firms have been in business for hundreds of years, they have prestige because of age and sufficient momentum to carry on in spite of competition and without the aid rendered by air transport.

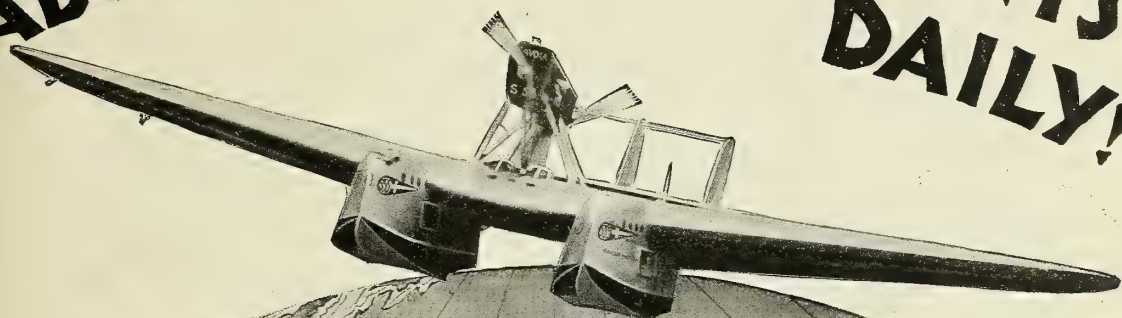
From an economic standpoint, American aviation is so far ahead of European that it is almost ridiculous to compare them. The reason for this is a simple one: American aviation is to a large extent self-supporting and absolutely independent of direct financial aid from the Government.

What we Europeans considered necessary for the development of air transport has become now the greatest danger to its healthy development. And we ought now to devote our main efforts to escaping from the clutches of government subsidization of airplanes. European aviation has miscalculated the real advantages of the subsidies in thinking that they were only necessary for development in the early stages and that, after a few years, the public would be so interested that civil aviation would be self-supporting. This reasoning has proved decidedly fallacious, for now ten years after the air subsidies were first paid, they seem more necessary than ever before. In the meantime subsidies have continued to grow enormously.

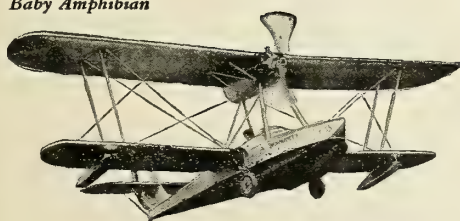
It seems to me that European aviation is caught in the net of subsidies and that it will be a gigantic task to get free. Nevertheless, European airline operators believe that their air transport system is considerably superior to that of their American colleagues, because they are able to show you their wonderful airports with the finest accommodations for passengers, large fleets of huge transport planes and tremendous airline mileage linking practically

(Continued on next page)

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(Continued from preceding page)

all the cities of Europe. But! Who pays for it? The citizens of the various countries whether they use the airlines or not. They pay for it by the uneconomical means of taxation. It has been said that fully 70 per cent of the air travelers in Europe are American tourists. And the rates are not based upon costs, as they are, and always will be, on the passenger airlines of the United States.

The following civil aviation subsidies were operative in 1922 and in 1928; the tremendous increase is significant:

	1922	1928
Netherlands airlines.....	\$125,000	\$ 394,000
German airlines .....	50,600	13,161,000
French airlines .....	91,000	40,780,000
British airlines .....	886,000	2,245,000

Local subsidies from municipalities, etc., would add about \$2,500,000 to the German figure for 1928.

After looking over these unfortunate figures, one can readily perceive that it will be a long time before European aviation can get along without subsidies. In the United States, on the contrary, commercial aviation was developed along the lines of the need for it. Had it not been for mail lines, the present degree of American commercial aviation development would not have been possible. It is my belief that immediately after the war the public was not sufficiently air-minded, and the technical development not sufficiently far advanced, to warrant passenger transport as a commercial proposition. The United States air mail has accomplished, during the last eight years, a wonderful pioneering work. It has shown American business the possibilities of the airplane.

The efficient regulations provided in the Air Commerce Act of 1926 stabilized the young industry both commercially and technically. After the great flights of Lindbergh, Chamberlin, Byrd and others, public attention was drawn to aviation. In the meantime, the Government directed the development of airlines in an efficient manner—not by giving subsidies but by establishing lighted air routes which make air mail just twice as efficient. Even now there is no air mail of any importance in Europe, because there is practically no night flying. In the United States, passenger transport started hardly two years ago, after the airplane had proved itself sufficiently safe and economical for the transport of business men and the general public.

In Europe, we started with passenger transport immediately after the War and tried to force this form of transportation into use before the public was ready for it. This was the direct result of war production of aircraft. Factories had to do something with their surpluses. Munition factories were adapted to the fabrication of other wares. But not so with airplane factories. For this reason I cannot blame European aviation. It seems strange, however, that nothing has been done to start night flying of air mail, the lack of which puts us behind the United States. Although the United States Government pays large sums in order that mail contractors may make a sufficient profit to handle the mail efficiently, either by air, rail or water, the expenses are warranted from the standpoint of service to the public.

In addition to the enormous sums appropriated for military aviation, European governments have spent well over a quarter of a billion dollars, in the past eight years, on civil aviation. If Europe had spent a tenth of the amount it has expended on subsidies for aids to air navigation, research, etc., perhaps the airlines of Europe would now be on a paying basis.

During the past two years of development in Europe; many difficulties and handicaps have resulted from the complete lack of coöperation between the different countries. There is an International Air Traffic Conference with coöperation on paper, but it has not materialized in fact.

It seems to me most illogical that there should be, as there are, companies of different nationality, each heavily subsidized, competing with each other over the same air routes. In the United States I found coöperation at all sides, even to a considerable degree among competing operators and manufacturers, through the media of chambers of commerce and associations.

The United States can learn much from the mistakes of Europe, and in the case of airports, learn a great deal by our example, for as I believe all will agree, our airports actually are superior. Consider, for instance, the airport at Rotterdam, Holland, which is not the largest or best in Europe but may well be taken as a criterion by Americans. This municipal airport (for it is owned by the city) is but three miles from the downtown section. Waalhaven, as it is named, has attractions for the general public such as an excellent restaurant where coffee or lemonade or beer (real) may be obtained for eight cents, and lunch for 40 cents. No person not directly concerned with airline operations is permitted on to the landing area, a regulation not usually observed in America. At Rotterdam it costs four cents for admission into the attractively appointed enclosure where the restaurant is located. On one day during Easter week, 20,000 persons paid to get in. From 8 a. m. until 7 p. m. over 2,000 passengers were carried in the large transport planes for \$2.80 each. On week days the large planes land and take off at frequent intervals. The public finds it interesting to watch and takes advantage of the really superb cuisine. Among alcoholic beverages, only beer, no wines or hard liquors, are served.

The airport is of turf; sheep keep it trimmed, and they are trained so that whenever an approaching airplane circles the field, they run into a corner so that they will not be in the way. Air traffic rules are rigidly enforced in Europe. I noticed an absence of any real system in this respect in the United States. In Europe a left turn is made after the take-off, and incoming planes circle the same way making a complete circuit before landing. Asphalt and concrete tarmacs are invariably placed around the hangars and other buildings.

The United States will come to this. It is just a question of time. When mail only was carried, there was no need for attractive airports, so long as the facilities were adequate for landing and taking off with mail loads.

As far as technical developments are concerned, I am absolutely convinced of the superiority of American air-cooled radial engines over European power plants of this type. It is difficult to compare American and European plane design. It seems, however, that it is unnecessary for American companies to buy European manufacturing rights, for American engineers can design and American factories build as good planes as any in Europe. The money now being paid for manufacturing rights could perhaps better be spent for research, particularly in the development of flying boats.

I have heard it said that the welders of the United States are the best in the world. I am not sure that this is true. Germany has some exceedingly good welders. There are some excellent planes built in France, and some poor ones,

(Continued on next page)

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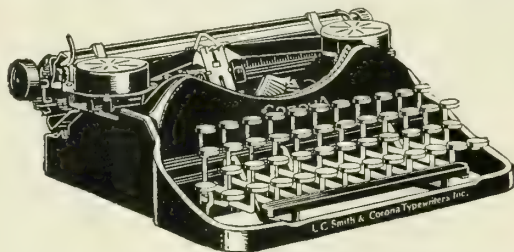
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(Continued from preceding page)

as is true of every country, including the United States. But in the United States, Department of Commerce regulations do not permit such ships to be used for commercial purposes. I have a great deal of respect for the intensive system of factory stress analytical and flight testing, and for the system of inspection employed by the Aeronautics Branch of the Department of Commerce. I had the pleasure of having a long discussion with Major Clarence Young shortly after he had landed at Le Bourget with his Stearman biplane. I wondered at the time what he thought of the European inspection and licensing systems, and, of course, he was too polite to volunteer comment.

Who can say whether European technical development is of a higher order than American? Suffice it to say, however, efficient and airworthy planes are more general in America than in Europe, although a certain few European products stand out as being superior to certain American planes of the same class.

## LOS ANGELES TO CLEVELAND NON-STOP

(Continued from page 60)

to keep pumping the gas with the wobble pump at frequent intervals, and was kept pretty busy all the way.

Finally, as I came into sight of the field I knew the gas would last only a short time longer. The engine soon sputtered from lack of gas, and I was glad to be within gliding distance of the finishing line. On checking my flying time I learned that I had been in the air 13 hours and 15 minutes, which was but 36 minutes less than the time made by Lee Schoenhair, who placed second.

## AN AMERICAN'S IMPRESSIONS

(Continued from page 74)

are operating at a loss. With the governments guaranteeing operating expenses, as they do, it seems more appropriate to term them "government airlines" rather than commercial airlines.

Such aviation enterprises as barnstorming, general passenger hopping and taxi service from town to town are relatively unknown in European countries. There are a few flying schools, principally in England. None of them, however, are as large or as well organized as our better flying schools in this country.

Because of certain legal restrictions, it is practically impossible for an individual or private citizen in England to own and operate his own airplane. As a substitute, there are several flying clubs in various sections of the country where one can learn to fly and may use the organization's equipment. From what information I could gather, however, I am inclined to believe that their importance is considerably overrated.

The established airlines in Europe I found to be very efficient. The ships depart and arrive on a very close schedule, and equipment is maintained in excellent condition. The larger fields which serve as terminals for the air transport systems, have excellent hangar and repair facilities, and the landing areas are usually in exceptionally good condition. The rates for passengers are very reasonable—much cheaper than those existing in this country. In fact, transportation by air in Europe costs little more than first class passage by rail.

I was surprised to learn that there are practically no lighted airways for night flying; aerial operations are confined almost exclusively to daylight flying.

There are a total of about 300 fields in the five countries that I visited as compared with about 15,000 flying fields

in this country.

In talking with various persons engaged in aeronautical capacities, I learned that they believe the opportunities for success in American aviation are much greater than in European aeronautics, and that we may consequently expect many of those who can migrate to this country.

Taken by and large, my impression was that progress is being made much more rapidly and that much more is being accomplished in the United States than in all of the five countries collectively, from a strictly commercial manufacturing and operating standpoint.

### THE ALL-METAL ZMC-2

(Continued from page 83)

accomplish the equivalent of 125 man-hours of manual labor.

The specifications and performance of the ZMC-2, are as follows:

#### Specifications

Length of hull.....	149 feet 5 inches
Diameter of hull (maximum).....	52 feet 8 inches
Fineness ratio.....	2:8.3
Displacement of hull .....	202,200 cubic feet
Total ballonnet displacement .....	50,600 cubic feet
Ratio of ballonnet volume to hull volume.....	25 per cent
Thickness of skin .....	.0095 inches
Length of car .....	24 feet
Width of car .....	6 feet 6 inches
Number of air valves .....	3
Number of gas valves .....	2
Number of fins .....	8
Total fin area .....	440 square feet
Total elevator area .....	190 square feet
Total rudder area .....	95 square feet
Total automatic rudder area .....	95 square feet
Engines .....	2 Wright Whirlwind J-5
Power at 1,800 revolutions per minute....	440 horsepower
Propeller diameter (all-metal).....	9 feet 2 inches
Gross lift (100 per cent inflation with 92 per cent pure Helium at 60 degrees F 29.92 in Hg)....	12,242 pounds
Weight empty .....	8,900 pounds
Useful load .....	3,342 pounds
Crew (three) .....	600 pounds
Fuel (200 gallons) .....	1,200 pounds
Oil (25 gallons) .....	200 pounds
Ballast (50 gallons) .....	420 pounds
Radio .....	180 pounds
Passengers and cargo .....	742 pounds
Cruising range.....	680 miles
Maximum possible range (still air) .....	1,000 miles
Maximum speed (440 horsepower)....	62 miles per hour
Cruising speed (220 horsepower) ....	50 miles per hour
Static ceiling .....	10,000 feet

### AROUND THE WORLD BY AIRSHIP

(Continued from page 51)

crossing of the Rocky Mountains, considered one of the most dangerous parts of the world tour. In Arizona headwinds were encountered, necessitating a change of course. The ship headed for Forth Worth from El Paso, then followed a northerly route over Chicago, Detroit and Cleveland.

While crossing the United States the dirigible's wireless operator was in constant communication with the ground, receiving communications and reports. Throughout the entire world flight the wireless operator kept in constant touch with the world, and received all available

(Continued on next page)

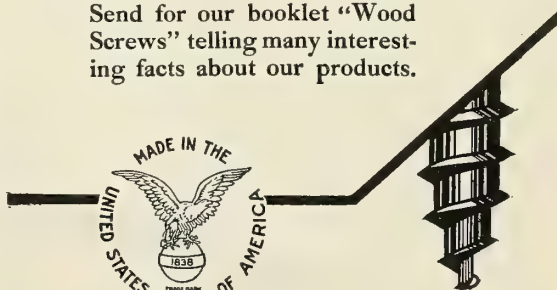


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**with Balsam-Wool Blanket"**

"We are experiencing absolute satisfaction from the use of Balsam-Wool in the all-metal Flamingo airplanes.

"Balsam-Wool placed between the outer metal surface and the inner upholstering surface adequately insulates the cabin from heat and cold. This material enables the operator to maintain a comfortable temperature in the Flamingo cabin at all times. Balsam-Wool has proven its worth to us also as an insulator against noise. In spite of the huge 525 H. P. motor on the Flamingo, conversation is carried on with comparative ease. The ease of installation, due to its being packed in rolls, and its non-inflammable qualities place Balsam-Wool in a class by itself.

"We are using it in the sixteen Flamingo transports on the floor now going through the production line.

METAL AIRCRAFT CORPORATION OF CINCINNATI

(Signed) Thos. E. Halpin, Vice President and General Mgr."

The United States Bureau of Standards, in reporting tests on airplane insulations (R. P. No. 63), found a BALSAM-WOOL Insulated wall to give the greatest reduction in sound units transmitted through the wall.

Considering that BALSAM-WOOL is also fire safe, light in weight, easily installed, and inexpensive, it is easy to understand why most manufacturers of cabin airplanes use this material to insure comfortable and quiet cabins.

Write for full information about Balsam-Wool.

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(Continued from preceding page)

data to aid the selection of routes. This performance proved the high safety factor that is given to a dirigible by its ability to use wireless efficiently.

The *Graf Zeppelin* came to earth at Lakehurst on August 29, after having traveled a distance of 19,000 miles around the world in 21 days, 7 hours and 34 minutes. The route taken from Los Angeles covered 2,940 miles, which required 51 hours. The flight had been a dramatic exposition of man's mechanical advance in one branch of aeronautics. It had also revealed some requirements of the dirigible which have not yet been supplied. It showed that mechanical means of handling airships will be required for dirigible service of any degree of efficiency, as will be improved sheds and terminal facilities, better weather information, and larger and speedier airships.

From the cabin of the *Zeppelin*, Commander Eckener stepped into a round of banquets and celebrations. He went to Washington to receive President Hoover's congratulations with those of other government officials. Returning to New York, he received the city's welcome, and, after seeing the *Graf Zeppelin* start on her flight home to Friedrichshafen, he visited the National Air Races at Cleveland. He then proceeded to Akron to confer with officials of the Goodyear-Zeppelin Corporation concerning the establishment of dirigible services.

Two trans-oceanic services were planned: weekly mail and passenger service from the United States to Hawaii, later to be extended to the Orient, and service from Europe and America. The Goodyear concern will build two *Zeppelins* for the trans-Pacific service, and the German *Zeppelin Company* is planning two similar ships for the Atlantic line. The program will be carried out by an affiliation of American and German groups.

The *Graf Zeppelin*, after refueling, flew to Germany with 17 passengers under the command of Capt. Ernst A. Lehmann, assistant director of the *Zeppelin Works*. The flight was made in 66 hours, which made the time of the Germany to Germany 'round-the-world trip one day less than the Lakehurst to Lakehurst time. On the invitation of Dr. Eckener, three officers of the U. S. Navy made the return flight to gain experience which would aid them in operating Navy dirigibles. The officers designated to make the flight were Lieutenant Commander Herbert V. Wiley, commanding officer of the Navy dirigible *Los Angeles*; Lieutenant Commander J. M. Shoemaker, in charge of the engine section of the Bureau of Aeronautics, and Lieutenant Roland G. Mayer, Construction Corps, attached to the *Los Angeles*.

It was especially appropriate that, as the *Graf Zeppelin* once more rested in her berth at Friedrichshafen, the weather observers of all the principal nations should be journeying to Copenhagen to formulate plans for oceanic weather reports. If the plans of the meeting are put into effect, the recent flight will be the last made with inadequate weather-reporting facilities. Surface ships of Great Britain, France, Germany and the United States will cooperate to secure and broadcast twice daily weather reports which will make the North Atlantic safer for aerial navigation. With the additional aid of Denmark and Japan, which will probably contribute the use of their stations, information concerning the meteorological conditions of the entire northern hemisphere will be available to scientists in the principal flying countries. Uncharted air routes such as confronted the *Graf Zeppelin* over Siberia and the Pacific will soon become things of the past.

The 'round-the-world flight was significant as an



achievement of aeronautics: it was the completion of dreams and a hope formed in the mind of Count Zeppelin in 1873, when he designed his first rigid airship. It proved to the public the feasibility of safe airships, and of safe aerial travel across the oceans. It confirmed the calculations of the ship's engineers and designers as to its structural strength for withstanding unfavorable weather, showed them with what forces the dirigible of the future must be able to cope, and flung out a challenge to weather observers and meteorologists to find a means of directing such aerial transports over favorable routes.

But, by engrossing the attention of all nations in a solution of common transport problems, and by calling for the unselfish coöperation of European, Asiatic and American nations, the flight of the *Graf Zeppelin* had a greater significance as a means of uniting international endeavor for a mutual cause that will result in a more intimate understanding between nations. The plans which have been formulated for trans-oceanic airship lines to be operated between continents by an international group, as a result of this flight, will advance the same cause for which the nations of the earth are now striving—the establishment of international trust for the perpetuation of peace.

### THE EARLY BIRDS OF AMERICA

(Continued from page 98)

has been possible to locate only this number. Over ninety applications failed to pass the Membership Committee, these parties having failed actually to pilot aircraft, in accordance with the requisites of membership. A nominal membership fee is demanded, but it is largely through the voluntary donations of active members that the organization is able to continue.

One of the predominant purposes of the organization is to collect historical data, including the personal records, photographs, newspaper clippings and articles written by members on the subject of aviation or their participation in aviation, and thereby preserve for posterity as nearly complete a record of the actual pioneering days of aviation as it is possible to assimilate. Plans are being made to create a national headquarters and museum where these records and other material and objects, such as parts of original aircraft, engines, etc., will be kept. There is a possibility of the publication of the national historical volume including the data gathered. An endeavor is also being made to get the biography of each and every member relative to his aviation activities, which will also be available at this national headquarters or in a published volume in order that the human side of the pioneering of aviation in America, as well as the actual progress of mechanics and design in those early years, may be retained and available.

On May 30th, 1929, the Holmes Airport was dedicated and an Early Birds Memorial Tablet of solid Italian marble, measuring 6½x8 feet, was installed in the exact center of the airport. This tablet reads:

"To those pioneers who gave their lives so unselfishly in breaking the trails of the air during the first decade of flight, this stone is dedicated by the Early Birds, May 30, 1929."

It is proposed to hold at least one yearly meeting and reunion which will be predominantly social, including a banquet and story telling of old-time events. The banquet will be open to relatives and personal friends of the Early Birds, who come as guests. The usual meetings are closed but, at this meeting, one of the principal functions of the society is discussed in detail—and this is, caring for members who are in financial difficulties or otherwise in need of

(Continued on next page)



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Absolute safety and dependability are of such paramount importance in modern aircraft, that they constitute the unwritten law by which everything in aviation is judged.

To meet the special need for aircraft, Champion introduced a few months ago, the revolutionary new Aero A spark plug for all aircraft engines.

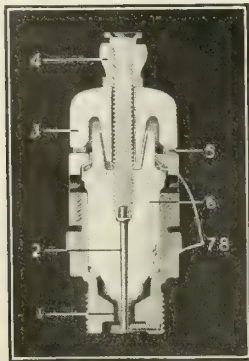
Developed after three years of the most exhaustive tests and experiments, the Aero A incorporates principles which bring to all engines a new factor of safety and dependability.

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The Champion Aero A cannot be broken in such a way as to interfere with engine operation. The carefully proportioned restricted bore permits the adaption of this plug to practically all modern radial air cooled and high compression water cooled engines. The exclusive sillimanite insulators will withstand a maximum amount of oil without fouling, and the heat range is such that pre-ignition is unheard of. Special analysis electrodes resist pitting and burning to the utmost, while molded copper gasket seals are permanently gas-tight.

Install a complete set of Champion Aero A spark plugs in your ship for maximum performance, safety and dependability.



## Champion Aero A Exclusive Features

1. Restricted bore. 2. Special analysis electrode. 3. Secondary sillimanite dome insulator. 4. Welded steel terminal. 5. Copper seal. 6. Primary sillimanite insulator. 7-8. Molded copper gasket seals.

Concentration on this one type spark plug (Aero A) for all aircraft engines enables Champion by virtue of large production, to offer this vastly superior spark plug at the extremely low price of \$1.25.

# CHAMPION

## SPARK PLUGS

TOLEDO, OHIO

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(Continued from preceding page)

assistance, and an endeavor is being made to follow out the motto of: "One for all and all for one" which the organization hopes to make a fact, it being the intention of the organization to keep in touch with all members and their respective positions. Many members who have been inactive in the industry for several years, since the war in particular, are again coming back into the industry and an endeavor is being made by a special committee to place them in their proper position in the industry.

Though it is appreciated that there are a considerable number of Early Birds today, it will only be a matter of a few years until these pioneers of the aircraft industry have dwindled to a very few and for this reason the organization was formed to bring closer together those men who, in the majority of instances, with privation and heartaches and with public sentiment rather skeptical, if not definitely against them, continued on their course and made the foundations on which the industry has been able to grow.

The insignia of the organization is an owl, it being considered that the owl is an early bird, having been up all night; also that the owl has a bone and that there is no meat on it, which is indicative of the privation of the early pioneers; also that the body of the owl forms an "E. B." for Early Birds and also a "13" for the thirteen years of flight.

The Early Birds' Board of Governors for 1929 includes: President, P. G. B. Morris; vice presidents, Brig.-Gen. B. D. Foulois, Anthony H. G. Fokker, Jean De Villard; treasurer, Capt. H. C. Richardson; secretary, Ernest Jones; trustees, Richard H. Depew, Jr., Dr. Henry W. Walden, Raffe Emerson, Walter Brookins and Earle Ovington.

## PARACHUTES

(Continued from page 59)

On August 24th, 1920, Mr. O'Connor was to demonstrate the Jahn parachute. Army officials insisted that the jumper wear a service type 'chute as a reserve. Although both Mr. O'Connor and Mr. Jahn protested vigorously against this precaution, the Army men were adamant. The demonstrator went up and jumped from a height of 2,000 feet. Nothing happened until he had reached a height of 500 feet. At this point the service parachute was called into use. It saved the demonstrator, for the new device, under test, had fouled its cordage.

The first emergency jump with a pack parachute took place on October 20, 1922. Lieut. H. R. Harris of the Army was engaged in a dog fight over McCook Field. His pursuit plane was placed in a steep bank while making 150 miles per hour. Suddenly the wings began to vibrate severely, tearing apart internally. Lieutenant Harris quickly decided his only chance was to jump. With this in mind, he unfastened his safety belt and stood up in his seat. He was blown from the diving plane, and after some difficulty, found the rip-cord ring which he pulled. Although he had fallen from 2,500 to 500 feet before opening his parachute, he suffered only a few bruises.

In general, the practical use of parachutes was viewed with much suspicion and doubt by aviators. In 1923 orders were issued to all Army and Navy fliers requiring them to wear a parachute on every flight. Most pilots, however, avoided wearing them if it were possible to take off without them. If compelled to do so, they would carry them to their planes, and then sit on them without so much as attaching the harness to themselves.

There were various reasons for this reluctance to adopt 'chutes. Few of the pilots had ever actually seen a descent, although two fliers had successfully made emergency jumps in the post-war pack 'chutes.

The new devices were far from comfortable when worn. Because the cockpits of the planes had not been designed for parachutes, it was with great difficulty that both the pilot and his 'chute could get into the same cockpit at one time.

Probably the predominant reason, and the most absurd, was one of psychology. Most pilots feared that their comrades would think they were afraid to be aloft without a safety-first appliance! That, perhaps, appears to be an impossible line of reasoning, yet consider how many of us fear what others may think of our everyday actions.

The eventual conversion of all service pilots to the everyday use of 'chutes came with faith in their ability to operate successfully in an emergency. For it was inevitable that faith should be established as more and more pilots were saved from certain death.

The first emergency jump in naval aviation was made by Gunner W. M. Cole on October 16th, 1924. Cole was flying under clouds at about 1,200 feet. Suddenly he felt a shock and saw that his left wing had been carried away by a second plane which had dived through the clouds. With his ship out of control he jumped clear, counted three, and pulled his rip-cord. The parachute opened at once, and landed him on the golf course of the Coronado Country Club. The occupants of the other plane did not survive the collision.

There are two methods of using a parachute. The first is termed the "pull off." The jumper walks out on the wing to a point where the opening 'chute will not foul the tail surfaces. There he pulls the rip-cord. The 'chute fills out in the wind blast, and the jumper is pulled off the plane and out into space. This method, however, is generally impractical for emergency jumps, being restricted to the training of parachute jumpers or used for exhibition purposes.

The second manner of jumping is the "free-fall," in which the jumper dives head first from the plane, waits until he is clear and then operates his rip-cord. This is the type of jump generally used for emergencies.

The minimum altitude for an emergency jump consistent with safety is considered to be not under 400 feet. Yet Walter Lees, a civilian pilot, who was flying a German war type LVG airplane near Dayton, jumped while his ship was at an altitude of 150 feet after his controls had jammed. The rip-cord was pulled and the parachute opened immediately to give the pilot a safe landing.

To the Army goes the credit for the highest jump on record. The jumper was Captain Stevens, whose interest lies more with aerial photography than with parachutes. One day when ascending on a photographic mission, he decided to make a record jump. At 26,000 feet he waved to the pilot, stepped over the side of the plane, and made a safe landing some twenty minutes later.

Parachute jumping at air meets is generally formed into a contest. The object is for the jumper to land as close as possible to a mark on the field. Professionals become uncannily proficient at this sport, although things may go wrong. The parachutist may not "slip his 'chute" accurately enough to direct his course, or the wind itself may play unexpected tricks.

Parachutes are sometimes used under unintentional circumstances. In the summer of 1928, Lieut. Dick Gaines was practicing acrobatics in a Navy fighting plane at an altitude of 9,000 feet. While in the inverted position at the top of a loop, he decided to fly on his back. His control stick was pushed forward, but too far, for the plane

(Continued on next page)

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(Continued from preceding page)

stalled while on its back. It then whipped into the mysterious "outside spin" and after two dizzy turns threw Gaines out in spite of his safety belt. After an interval the astonished pilot pulled his rip-cord and floated slowly down to the surface of San Diego Bay, where he was picked up by a seaplane.

Parachutes are now in approximately the same status in commercial aviation as they were in military aviation several years ago. Pilots who have seen lives saved generally are enthusiastic about them and some of them wear parachutes, but the percentage is pitifully small.

A year ago few, if any, commercial aviation schools used parachutes for either instructors or students. In three cases, school operators have told representatives of a well-known parachute company that if any one school could be persuaded to use parachutes they would gladly follow the example. Here, again, responsible men were afraid of the opinion of others. Afraid to use a recognized life-saving device for fear they would be thought cowards!

Finally, a long-established aeronautical school was prevailed upon to adopt the 'chute. Furthermore, it advertised the fact. As a result, more and more operators are noticeably falling into line and installing parachutes as standard equipment.

Very few, if any, passenger planes carry parachutes for either the passengers or pilots. A well-known California operator recently stated that only a very few of his passengers asked if they were to use parachutes during a flight. After ten years, this flier has never encountered anyone who refused to take a flight because of not being equipped with one.

Would the average man or woman continue to fly with aerial transportation companies if he or she were asked to wear parachutes? Very likely not. The prospective passenger would think that the company doubted the ability of its pilots to get their planes safely back to earth. Instead, this potential passenger would go next door and fly with a company which could not afford to provide him with a last-resort safety device! Patrons of steamship companies continue to patronize ships on which life preservers are provided, for they realize that the company, instead of indicating doubt in its crews and equipment, is being foresighted.

On the other hand, there are several practical reasons why commercial transport planes do not use the parachute in its present form. Unquestionably, there are people who would not jump under any conditions. It is doubtful if an elderly person or a child would go over the side into space, even if told that it was his only chance for safety. The passenger would not know exactly when to jump. If he should become terrified by a particularly bumpy flight, he might jump a perfectly safe plane at any time.

One can picture a group of passengers being lectured to on the operation of a parachute prior to a flight. Shortly after the lecturer had come to the words, "Jump, count three and pull the ring," he would need lecture no further, for his passengers would most probably have disappeared.

It seems, then, that for passenger-carrying planes the parachute must be developed in a different direction. One method would be to drop the passenger automatically out of the plane as he sits in his seat. The parachute would, of course, function automatically. If some means could be found to lower the entire plane to safety, the element of responsibility would be removed from inexperienced passengers to a competent pilot. The pilot's technical knowledge alone would decide upon the necessity of using the safety apparatus.

The first successful drop of an airplane by means of a parachute occurred on August 24th, 1926, at Inglewood, California. The plane was a war-time Jenny, weighing 2,400 pounds and was piloted by Carl Oelze, a naval aviator. The plane was placed into a stalled position and the huge parachute was successfully operated at an altitude of 1,800 feet. Since then, several airplane drops have been made with varying degrees of success. The landing gear may be broken, but this will contribute towards relieving the shock of landing.

Parachute companies are prepared to provide any size parachute needed. Development must now come from aircraft manufacturers in the proper construction of planes strong enough to withstand the drop. The location of the parachute in the plane is an important factor in order to prevent fouling during a spin or some abnormal attitude.

A pilot does not always wait until an emergency in order to make use of his parachute. Any number of circumstances may determine its use. If engine failure occurred while flying at night over strange territory, most experienced pilots would "bail out" without hesitation rather than attempt a landing, even with special flares and landing lights. Fortunately, most airplane engines of today are reliable and this circumstance seldom happens.

The same problem is presented to the flier up over a layer of clouds or fog. It will be recalled that two of Colonel Lindbergh's four jumps resulted from arriving at his destination at night, short of gas, only to find it fog-bound. Unable to find a hole through which to descend, he climbed high just before his gas ran dry—and jumped!

The parachute is not always used as a life-saving device, though that is its primary purpose and the principal reason for its existence. It has been used as a means of getting to the ground when there was no other way possible, or when speed was desirable. In July, 1919, the British dirigible R-34 made its memorable transatlantic flight to the United States. After the ship had been buffeted about by storms and head winds, it became a grave question as to whether or not she would have sufficient fuel to enable her to reach American shores. With economical operation, however, the giant airship managed to reach her destination, Long Island. A quick landing was imperative because of the fuel shortage. In order to direct and speed up operations, Major Pritchard descended to the ground in a parachute. The ground forces were thus able to cooperate more closely with those aboard the dirigible, and a landing was speedily effected.

Everyone remembers that the Junker monoplane *Bremen* was stranded on Greenely Island in April, 1928, after completing the first non-stop crossing of the Atlantic by a plane from east to west. After the pilots had been flown to New York by commercial planes, the Army undertook the job of delivering a Junker's pilot to the *Bremen*. He was to repair the damaged plane and fly it to New York City. General Fechet and Lieutenant Quesada flew north in one amphibian, while Captain Eaker and Fred Melchoir, the German pilot, flew in a second amphibian. After numerous harrowing experiences in fog and ice, the two Army planes reached their destination on May 19th, 1928. The winter's ice was beginning to break up and a landing on either land or water was out of the question. Nothing daunted, Melchoir jumped with his parachute and made a safe landing close to the *Bremen*.

Food and mail have been dropped to forces stranded by storms and floods. Ammunition has been dropped to besieged troops. Eventually, perhaps, transport planes will not stop at the smaller cities en route, but will deliver their

(Continued on next page)

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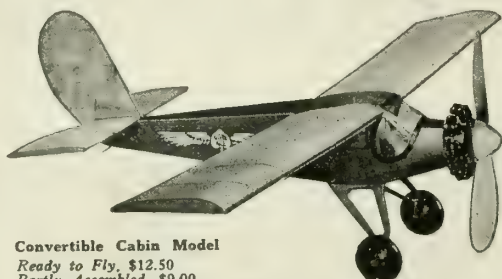
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CHICAGO



*(Continued from preceding page)*

freight to the station agent by means of a parachute.

The members of the Caterpillar Club are recognized as those whose lives have been saved by an emergency jump with a parachute. Several men are double members, but Colonel Lindbergh has the unusual distinction of having four emergency jumps to his record. The club name is a silent tribute to the lowly creature who spends his time weaving silk fibres which later become so vitally important to the aviator.

The parachute is not a panacea for all the deplorable accidents that happen and are bound to happen to airplanes as long as the human element enters into their operation. It offers, however, a chance to the flier when he needs it most of all. If properly used, it will operate without fail. For military pilots it is an absolute necessity. Its use is increasing in commercial aviation and when sufficient development has taken place, its use, in some form or other, will unquestionably be universal.

## THE SCHNEIDER TROPHY RACE

*(Continued from page 55)*

established organization of high-speed fliers, kept more or less intact from year to year. All its members are men who have graduated from special courses of instruction and have taught flying in government schools. This group is, in fact, called the High-Speed Flight, and membership in this flight is a distinct honor and a tribute to superb flying skill. But the Italian practice of strict medical supervision and rigid physical training is not followed.

The High-Speed Flight is commanded by Squadron-Leader Orlebar, a thin, square-jawed man with a characteristic intensity of gaze and gleam of eye. All the correspondents at Calshot who were former military men remarked on the aptness of the choice of Orlebar as commander, for he is not only a man of thorough military training and a graduate of the Staff College, but is himself one of the finest racing pilots in the United Kingdom. He will not allow one of his men to enter the cockpit of a racing plane until he himself has test-flown that plane to his satisfaction, and assured himself that it is safe enough for his men to handle.

Members of the High-Speed Flight include: Flying-Officer H. R. D. Waghorn, Flying-Officer T. H. Moon, Flight-Lieut. D'Arcy Grieg, Flight-Lieut. G. H. Stainforth and Flying-Officer R. L. R. Atcherly. Moon is engineering officer, and his duties and responsibilities keep him in the testing sheds. All the remaining members of the flight took part in the race preliminaries and the flight testing of Britain's entries; and three, Waghorn, Atcherly and Grieg, made up this year's Schneider Trophy team.

Britain built four machines for this year's race, two of which came from the shops of the Supermarine Aviation Works, Ltd., and two from the Gloster Aircraft Co., Ltd. The two Supermarine machines, Type S-6, are fitted with Rolls-Royce Type "R" engines, of which more will be said presently. The Glosters are powered with Napier Lion engines, of special design for these machines. The Royal Air Force extended every possible aid to the manufacturers of both planes and engines.

The Supermarine S-6 is a low-wing, all-metal monoplane, and is a development of the S-5 which won the Schneider contest in 1927 at Venice, and in which Flight-Lieut. D'Arcy Grieg set a new unofficial speed record in 1928. The S-6 is a trifle larger than its predecessor, because of the increased engine weight and size. The S-6

weighs nearly twice as much as the S-5, but its engine power has been more than doubled, hence the power-weight ratio has been improved a little. Wing radiators are covered by the duralumin skin of the wing surface, affording no direct radiation. They are built up of two layers of duralumin with a very narrow waterway between, and are calculated to act as strengthening factors in the structure of the wing itself. The huge engine demands heavier supporting members in the fuselage, and balance requires the fuselage to be mounted on the floats by means of inclining struts. The twin floats are of duralumin and contain the fuel tanks. Oil tanks are located in the tail fin, the surface of which provides radiation for cooling. The corrugated surface on the sides of the fuselage, which have interested so many observers, are conduits for oil from these tail-fin tanks to the engine, and they provide additional cooling surface.

The Rolls-Royce "R" engine remains a secret, even after winning the race and attracting world-wide notice. The only description of it which was given to correspondents is that it is a 12-cylinder V-type, water-cooled power plant, with geared propeller and a new high-efficiency supercharger. Its predecessor, known as the "H" engine, attracted considerable attention in England recently, and was rated at 830 horsepower, but had no supercharger. Estimates of the horsepower of the "R" type vary between 1100 and 1500.

Four Macchi monoplanes were used in this year's contest; two Macchi 52 and two Macchi 67 models. The twin-engined Savoia-Marchetti 2,000 horsepower biplane which had been announced as a competitor was not utilized.

Navigability trials had been completed the day before, and on the seventh of September the contestants were lined up off Ryde Pier on the Isle of Wight for the start. Waghorn, in his S-6, crossed the starting line first; turned the first pylon off Sea View at a wide angle and dashed off at an estimated speed of 350 miles an hour. The second starter, Dal Molin, followed immediately but was hampered in his take-off by sudden rough water. The other contestants followed in rapid succession, at fifteen-minute intervals. Waghorn flew four laps before Dal Molin started, and his engine made three times as much noise as Waghorn's Rolls-Royce, which led the crowd to believe that the Italian was faster. The millions watching the race had the feeling that they were being bombarded by shells every time the fliers zipped past. A roar, a scream of wires and a flash of color, and they were gone again before watchers could see them. Monti did 301 miles per hour on his first lap, only to have an oil pipe burst and shower him with burning oil. He made a magnificent landing although suffering acute agony and fighting for his life before assistance was given.

Lieutenant Cadringer, the other Italian to make a forced landing, was nearly suffocated, as he came down, from engine fumes which filled his cockpit. Atcherly made his first lap at 303 miles per hour, and for the next six laps gained consistently on Waghorn, but was disqualified for cutting a pylon on the last lap. Grieg, poking along at 282 miles per hour in his 1927 Gloster-Napier, provided merely a backing for his compatriots in case disaster should befall the S-6 machines.

Waghorn, first to start, led the field throughout and won first place with an average of 328.63 miles per hour. Dal Molin, the only Italian to finish, captured second prize with a speed of 282.11 miles per hour. Grieg himself was surprised to find he had placed third with an average of 282.00 miles per hour.

*(Continued on next page)*



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AD

(Continued from preceding page)

Immediately after the race, Commander Orlebar officially protested Atcherly's disqualification to race officials. Atcherly explained his inability to see the course by saying that his goggles had become oiled during the first lap and in trying to remove them and reach for a second pair he had lost sight of the pylon. Atcherly was officially credited, however, with the fastest single lap time and the fastest speed at which man had ever traveled, 332.49 miles per hour.

The victory of Great Britain in the 1929 race means that she will have the responsibility of organizing the Schneider contest again next time.

## MANUFACTURING THE WACO

(Continued from page 80)

The turtle deck is of spruce and is nailed to the fairings. Fabrioid is used for lining both cockpits, the seats of which are upholstered with padding covered with fabrioid. The cockpit cowl is edged with leather padding around the openings, no crash pads being used. After covering, the fuselage goes to the paint room.

The cockpit cowl, engine cowl, instrument boards, spinners, landing gear streamlines, seats, doors, inspection plates and other aluminum parts are made over master forms. Being first formed by hand, an electric hammer completes the shaping. The metal is then filed, sanded and rubbed before painting, and is as finely finished as is customary in automobile body factories. The cowl for the Hisso models is stamped out of aluminum.

Gasoline tanks are made of terne plate, with two full-size baffle plates. The seams are first turned, riveted and then soldered. A one-quart sump is riveted and soldered to the bottom. On the cowl, all edges are turned over a wire shaper which acts as a stiffener for the beading.

The Paint Department occupies one corner of the main factory building, divided from it by cement block partitions with fire doors between. Nine exhaust fans of the two-bladed propeller type, operate under an elongated hood for drawing the fumes outside the building. Air pressure for the spray guns is supplied by two compressors located in the boiler room, pressure being maintained at 80 to 90 pounds. Three York units, drawing cold air over heated steam pipes, force warm air into the room and keep it at an even temperature for drying.

The fabric covering of the wings, center section and tail surfaces are first treated with three coats of "dope," each coat being sanded. Because of the close weave of the fabric and method of applying the dope, the fabric is not translucent. Two coats of aluminum paint are next sprayed on for keeping out the actinic rays, after which the desired color coats are put on.

After the fuselage has been painted, it is taken over to the second assembly line where the engine is mounted, the center section and tail surfaces attached and the landing gear fitted. The center section is installed with N-struts determining the positive stagger. Two cables are used for lateral stability. In the OX and Hisso models, the radiator is suspended from the center section. In the case of the Hisso models, a wind-driven gasoline pump, supplemented by an auxiliary hand pump in the rear cockpit, is installed as standard equipment. Headrest, cockpit covers, doors and seat cushions are put in by this department.

In this department, OX and Hisso engines are overhauled and rebuilt. They are then block tested before being

(Continued on next page)



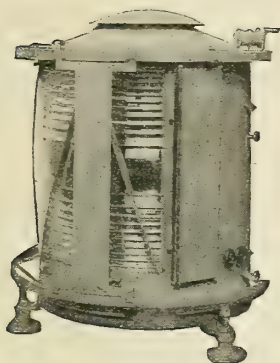
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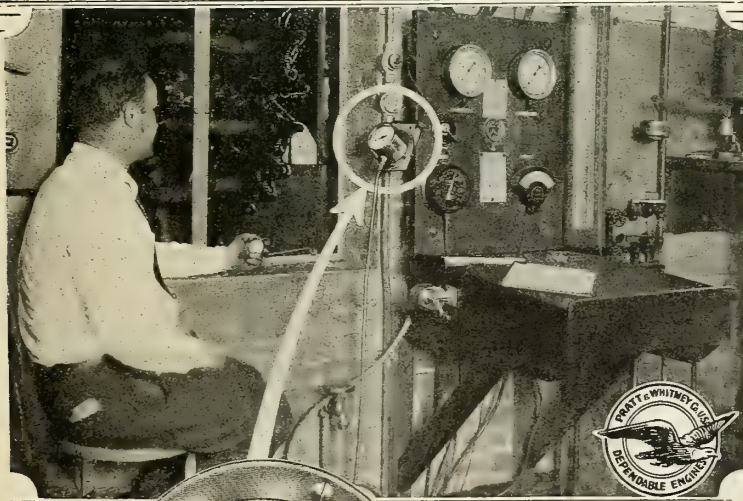
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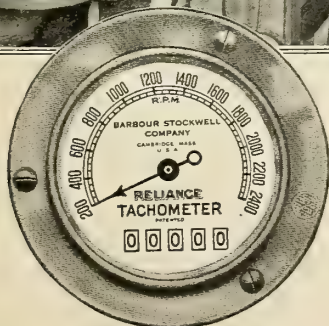
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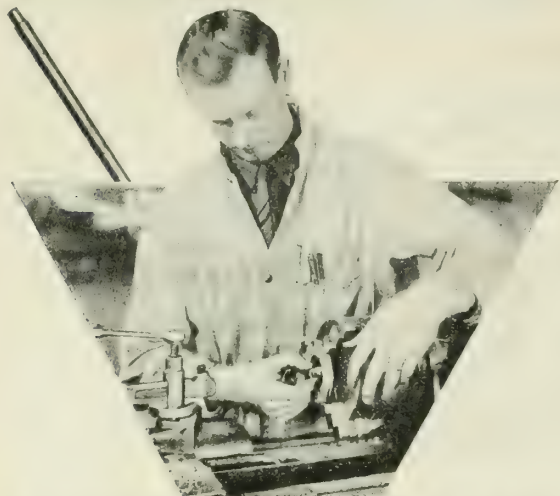
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8221

(Continued from preceding page)

mounted. In cases where the customer supplies the engine, it is also subjected to a block test. Stiff lace wire engages shoe hooks and Klondike grommets on the baggage compartment.

The elevators are operated by push-pull tubes with an eight-inch leverage and are anchored to the horizontal stabilizer by four hinges. The horizontal stabilizer is adjustable from the pilot's cockpit, a notched sector maintaining the position.

The landing gear is of the split axle type, streamlined and with a 78-inch tread. The V-struts are of .095 gauge steel, and the axles of chrome-molybdenum steel. The front struts bolt to the first cross member of the fuselage, and the rear struts to the second. Streamline covered wheels, 26 by 4, are used on the Waco 90; wheels on the 150 and 180 models are 30 by 5; and the Whirlwind models are equipped with 30 by 5 Bendix wheels and brakes. All models are fitted with pontoon lugs welded to the lower longerons.

Oleo shock struts are used instead of shock cords. A light oil with a very low cold test is forced through a valve in the piston to an upper chamber, the piston finally resting on two shock springs, as the weight of the plane is taken up by the landing gear. The piston travels about six inches from one extreme to the other. On the Whirlwind models, pneumatic shock struts are used, employing air pressure and oil pressure in combination on much the same principle.

The tail skid is of spring leaf type, with a manganese steel shoe, easily replaceable.

The wings, using two wing struts and one aileron strut, are rigged with Macwhyte streamline wires. The landing wires are attached at the upper end to a double center section wing fitting and at the lower end to a double wing fitting at the base of the struts. The lower ends of the front flying wire and drift flying wire attach to a welded wing fitting on the fuselage; the upper ends extend to the fitting at the top of the struts. The anti-drift flying wire and rear flying wire are fastened to the welded fitting on the fuselage below the front cockpit and at the top of the struts.

The ailerons are operated independently of each other, no balance wire being used. Consequently, failure of one set of ailerons would not disable the airplane, since the other set would still be operative.

Ground tests consist of checking the engine performance on both magnetos and then separately, the action of the controls, functioning of different engine instruments, taxiing and operation of the brakes.

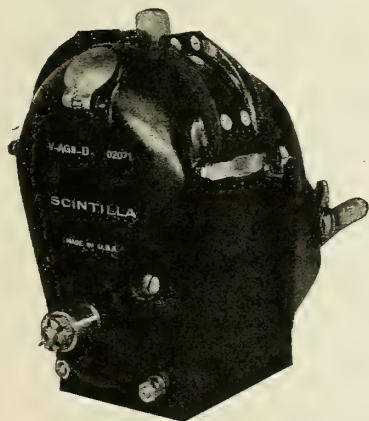
Each Waco is flight-tested before delivery. Freddie Lund, well-known to all the flying fraternity, is chief test pilot. In flight-tests the take-off, climb, longitudinal and lateral stability and operation of the instruments are noted, after which the ship is put through a series of maneuvers consisting of rolls, spins, loops and turns. After landing, the test pilot makes a written report covering the different phases of the test, and certifies that the performance is satisfactory and that the airplane is ready for delivery.

About 50 per cent of the deliveries are "flyaway," the balance being carload freight. The shipping department is located in a steam-heated part of the main building with a private railroad siding extending 200 feet and submerged to floor level. Five planes can be loaded in one box car. The wings and tail surfaces are packed above the fuselages and are securely blocked against friction. A two-ton electric traveling crane is available at one end of the platform for loading export shipments.

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## FLYING BOAT DESIGN

(Continued from page 87)

of extreme importance in these conditions.

At taxiing speeds of about 15 miles per hour the side floats give the greatest hydrodynamical lift, aiding the boat to plane at about 25 miles per hour. During the planing the side floats are entirely clear of the water. In order to avoid shock during planing, the bottom has a pronounced V of about 27 degrees medium angle. The outer part of the bottom V is curved so that the water is thrown downwards with a corresponding increase in lift. In front of the main step, the keel is widened to a narrow gliding surface with hollow sections, which firmly supports the planing boat shortly before take-off. The V shape is so steep that, in spite of the curves of the outer part of the bottom, the boat does not pound in rough seas. The bottom aft of the main step has straight V sections until near the second step, where it is shaped somewhat similar to the main step, though less pronounced, in accordance with the smaller hydrodynamic forces acting on the second step. Aft of the second step, the bottom has a straight V rising sharply in order to be free from the water at all speeds.

The hydrodynamical problems to be solved in order to produce a flying boat bottom that will plane with the smallest resistance and greatest lift are very similar to those of water turbines where a maximum torque obtained from the flowing water is the object. Therefore no genius can design the best shape of a flying boat hull; this will be found by experiments alone. We have carried out more than 2,000 towing tests in a model basin, running several hundred models over a total distance of more than 1,000 miles. The results obtained by these model tests have been checked by hundreds of actual take-off tests with several types of flying boats. The take-off conditions of a new type can, on this experience, be predicted with an accuracy of 5 to 8 per cent regarding weight. Though we have made some progress, there is still much to perfect.

The very deep sharp V and the narrow gliding surface in front of the main step have the advantage that the boat planes in a very high position, which means about 4 feet higher than the floating position at rest. It is obvious that this high planing position offers excellent protection for wings and all other parts of the structure when taking off in a rough sea. So far take-offs have been made in waves of 12 to 15 feet. On the other hand, the small water resistance of this shape of hull has resulted in a good take-off from a calm sea with maximum load, which is not astonishing considering that all the towing tests have been made on smooth water.

Aside from workability, materials for flying boats must have a good proportion of strength to weight, and unlike the materials of land machines, their qualities must not be changed by the influence of seawater. Therefore, in the course of further development, wooden structures and canvas covering of wings should be replaced by duralumin sheet construction.

Great care must be taken to avoid corrosion by means of suitable materials, working methods and protective means, such as coats of other metals, paint, grease, etc. All structural details should be so simple in design and built of so many separate parts that everything can be easily inspected and maintained from all sides.

Water-tightness forms the best anti-corrosive protection for the inside of many parts, since it is the only means of excluding all corroding moisture. It is largely for this

(Continued on next page)



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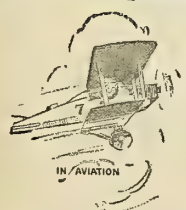


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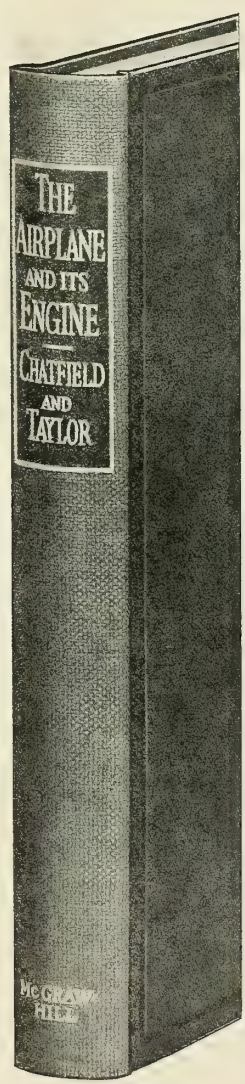
the blades of a pair of great shears, making a clean complete cut. Capacities on flat stock include 1½" x 9/32", and on stranded wire rope up to ¾".

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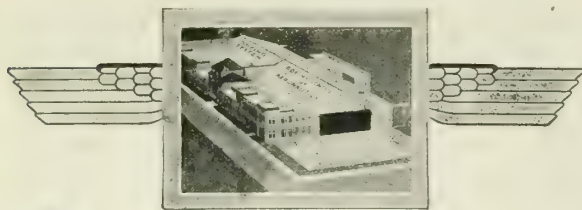
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(Continued from preceding page)

reason that the duralumin wing box girders of our later flying boats are watertight over the greater part of the span. As a secondary result, buoyancy of this wing box girder alone could keep the machine afloat indefinitely.

In big duralumin flying boats, the flat skin plates of wing and hull, by means of stiffening profiles, should take a substantial part of the stress. Very much weight and labor would be needed, however, to provide stiffening profiles so close together that considerable compression of bending forces could be transmitted by the skin. Therefore, the structural members of all parts are so arranged that profile girders take the compression stress, whereas the skinplates transmit the shearing forces by means of rather widely spaced stiffeners. The shearing stress of a flat skin is much greater than that of a curved one of equal weight. Therefore, and because of cheaper construction, our flying boats have flat sides and decks. The mechanical qualities of skinplates under shearing stress have been systematically studied by numerous experiments.

Our weight prediction for a new type is correct today within 5 per cent. The whole development of the flying boat design has reached the stage where, for a given design, we can predict with great accuracy not only its flying performance but also what it will do on the water. This means that flying boats can now be designed with certain predetermined and commercially desirable qualities and performances.

I am sure that all this has brought us only to the beginning of the real development in flying boat design which will be based on their transportation utility.

Paper presented at the Great Lakes Aeronautic Meeting of the American Society of Mechanical Engineers, Cleveland, Ohio, August 31, 1929.

## THE WHEREFORE OF WAR

(Continued from page 56)

The picture today?

As the Federal Oil Conservation Board has it, the United States possesses only 18 per cent of the total petroleum resources of the world. For the 54 additional per cent of petroleum which we produce, we call upon foreign oil fields for the crude product. It is not a pretty situation to be in; for, with declaration of war on our doorstep tonight, we would find three quarters of our petroleum production stopped for lack of a crude oil supply. Suppose those three quarters to be under enemy control?

There is only one answer. Immediately war comes upon us, we must be in a position to strike and strike hard for a corner in oil. Airplanes will do this—and nothing else. The War Department knows this, the Department of Commerce knows this. It is not for a whim that the Canal Zone was closed to foreign planes in transit until February last—or in other words until American commercial networks could be established. It is not for nothing that our aerial postal lines stretch into the heart of South America.

War will come upon us once more as it always has, but it will not come unless we get soft enough and flabby enough to forget the vital part that oil and planes are to play.

Let us not point to the Flag in answer to all questions. Let us not say America always because it is America.

Let us be rational, sensible. Ours is a polyglot race, composed of all people from all climes, but our country is a business organization and a sensible one—hence suc-

(Continued on next page)

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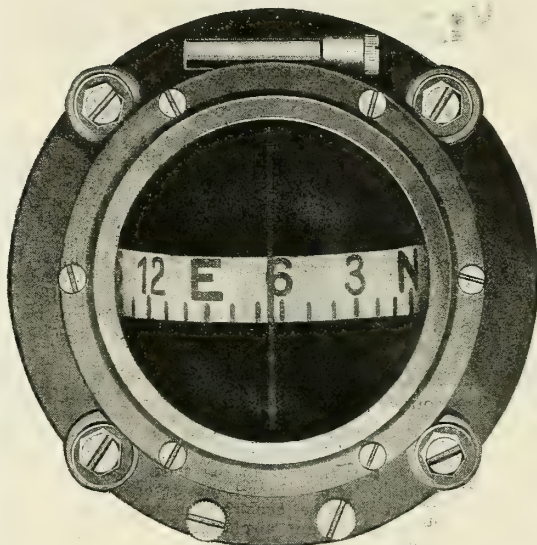
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The development of the airplane during the past decade has been amazing—its future growth is insured by the great commercial demands made of planes. Why not enter aviation by this highly paid, most important route—and *advance with it*? Decide today to be an Aircraft Welder—command high pay—enjoy permanent employment! To be in line for promotion to Department Heads, Factory Superintendents, Designers—you must know Aircraft Welding. Our technically trained graduates are successfully located in leading factories everywhere.

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Send me, without obligation, information concerning your School, the possibilities open to your graduates and your Placement Service.

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(Continued from preceding page)  
cessful. Let us keep it so, let us look to the future as one does in business. Let us look upon wars as the hazards of business, for God knows, *nouveau riche* that we all are, we may not be able to stand adversity!

No false patriotism, no bluff, no bounce. Common sense, my Friends, based on business foresight.

Let us, in the name of common sense, heed the writing on the wall while the ink is fresh.

Oil!

Planes!

### DEVELOPING A NEW MODEL AIRPLANE

(Continued from page 65)

Furthermore, the low-wing type made possible a retractable landing gear, a feature which has added 18 miles an hour to the speed of the Bullet.

At a conference between executives, factory officials, engineers and research men, market reports of distributors and dealers were analyzed in order to ascertain the sales possibilities of aircraft of various sizes. It was decided a four-place ship probably had the broadest market within its price range and service requirements. Whereupon, our engineers explained that with a plane of that size it would be possible to reduce parasitic resistance by smoothing out the lines to such a degree that the ship would carry not only four large people, but also (as we indicate the extra space and payload capacity) one healthy dog, providing the dog had not had lunch.

These fundamental points settled, the engineers were instructed to proceed with the design, always keeping closely in touch with the practical research department and the more practical factory manager. This coöperation was essential because it was realized that a most important factor in the complete success of the new model would be simplicity and economy of production. Simplicity for the benefit of the flier handicapped by complications in the field. Economy, to enable the factory to reduce costs, and thereby lower the selling price.

Our engineers had the assistance and advice of two expert metallurgists, who contributed ideas for saving weight by the application of new metal combinations in highly stressed parts of the ship.

The engineers were not satisfied to base their designs on the *calculated* strength alone of any material used in a stressed part. All parts bearing stresses, whether of wood or metal, were therefore subjected to strength tests in our special machines, similar to those in service in the Bureau of Standards at Washington, D. C. Parts were loaded down until they failed, and the actual breaking point carefully measured. Several wing sets were thus loaded down—in some cases with as much as nine tons of sand. Likewise, the tail surfaces were sand tested. Other tests were made to determine the influence of the absorption of moisture on the strength of wood parts.

Several types of control hook-ups were designed and tested, both on the mock-up and in the air. During the flight tests a number of professional and private pilots, including the president and vice president of the company, flew different models and commented on their flying characteristics from the standpoint of the commercial and amateur flier.

Speed tests were run with a number of different kinds of wood and metal propellers set at a wide variety of pitches. A number of dead engine gliding tests were made in the thin air above Pike's Peak, to determine the ship's

(Continued on next page)





## FIVE-TIMES-FASTER LAYING INSURES LOW TOTAL COSTS!

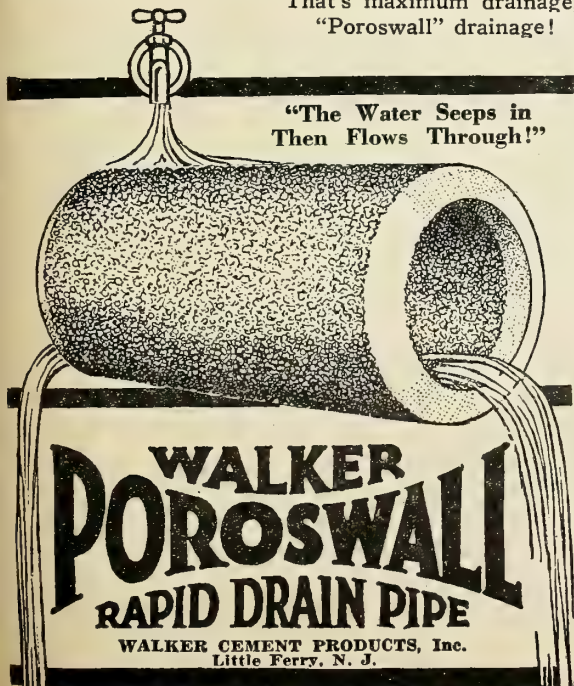
**N**O bell-holes to dig . . . no need for blocked ends . . . no wrapping of joints . . . no delays and high costs in laying operations in the case of "Poroswall" Rapid Drain Pipe. Spigot-end into bell-end, as the illustration shows, and instantly two lengths of pipe are laid!

The engineer who specifies "Poroswall" need have more easily, quickly and economically laid, but they automatically insure drain lines that are straight and true and, for that reason, incomparably more efficient.

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### Table of Contents

CHAPTER ONE	Airfoils, Lift and Drag
CHAPTER TWO	Control
CHAPTER THREE	Inherent Stability
CHAPTER FOUR	Interesting Points in Design
CHAPTER FIVE	Construction of Airplanes
CHAPTER SIX	Practical Flying— The Slotted Wing
CHAPTER SEVEN	The Weather and Aviation
CHAPTER EIGHT	Airports—Airways—Safety
CHAPTER NINE	Pilot Licenses—The First Lesson
CONCLUSION	Terminology.

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"Have read your book 'The Modern Airplane' and am very well pleased with it. I read it over twice with as much interest second time as first." ARTHUR LYSON, GRAVELBOURG, SASK.

"Am in receipt of your book 'The Modern Airplane' and wish to say that it is very interesting and I have enjoyed reading and studying it so much." W. A. KERR, JR., COTULLA, TEXAS.

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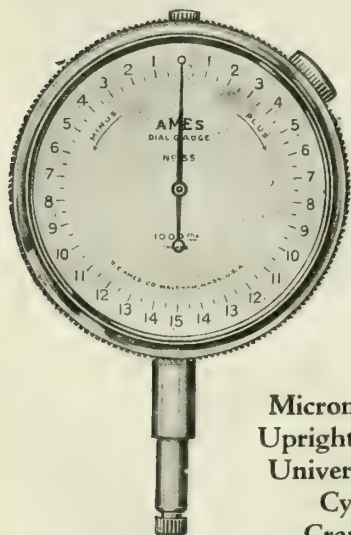
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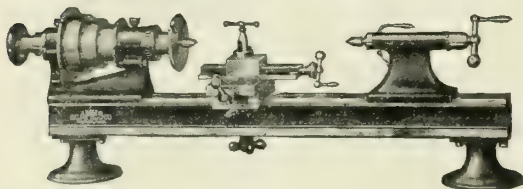
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(Continued from preceding page)

efficiency at high altitudes. The plane was glided with a dead engine from 2,000 feet above the peak to a point 5,000 feet above the Alexander Airport, fifteen miles away, and spiraled down to a landing.

Spin tests were made with various sandbag loadings up to 1,050 pounds, in order to determine how hard it was to spin the ship and how easy to recover. Careful tabulations were kept on take-off tests under sandbag loadings. Speed tests indicated that, with the landing gear retracted, 16 miles an hour were added to the top speed in level flight. Further improvements in the undercarriage have increased that to 18 miles an hour. Cross-country trips were made to test the ship under conditions obtaining at different landing fields and altitudes.

Different types of apparatus for retracting the landing gear were tested until the most efficient was found. The device was worked out to snap down in flight. But against the possibility of its jamming, it was arranged that it could be levered down quickly by the pilot. One man, while flying, draws up the gear by himself. So confident did pilots become of the landing gear that four men made a 240-mile flight to Texas at an average altitude of 30 feet, with the landing gear retracted. At cruising speed the plane has sufficient reserve velocity to zoom at least 150 feet in event of engine failure, giving the pilot a greater opportunity to choose a place to land in such an emergency.

The mechanism was designed so that the position of the landing gear was apparent at all times to the pilot.

No manufacturer of airplanes or automobiles today can afford hurriedly to dump a new laboratory product onto the public before it has been perfected in every degree. No matter how fundamentally perfect that airplane or automobile may be, a few minor defects will damage its future market immeasurably.

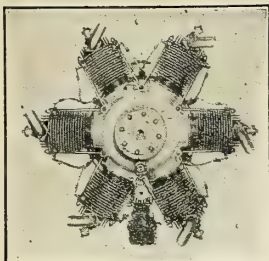
### INTRODUCING AN ADVANCED PHASE OF ENDURANCE FLYING

(Continued from page 53)

On the next leg of our flight to Cheyenne, we encountered high head winds and were forced to detour around several storms. Realizing we could not make Cheyenne before dark, we dropped a message at the air mail field at Elko, Nevada, requesting that one of our refueling planes at Cheyenne be sent to meet us at Rock Springs. We arrived over Rock Springs shortly before dark and attempted a refueling. Because the air was so rough while gasoline was being transferred, the refueling hose was severed by the *Sun God's* propeller, spraying gas all over the ship. Walker and I both thought the flight was to end there, for we had very little gas left and it had grown dark. But just as we were preparing for a landing, the refueling ship was taking off with a flashlight dangling at the end of the refueling hose and one in the hand of the hose operator. One hundred and fifty (150) gallons of gas was transferred with the aid of these two flashlights and the 20 feet of hose remaining on the refueler, enabling us to remain over Rock Springs until morning.

Further difficulty was experienced the next morning at Cheyenne. The extremely rough and bumpy air caused us to break contact after repeated attempts. Sufficient gas was taken on there, however, to enable us to continue to North Platte, where a full load was received before we

(Continued on next page)



The Department of Commerce has approved the new Brownback C-400 . . .

Featured by simplicity of construction, economy of operation and low r. p. m. this new aircraft engine is ideal for commercial flying.



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This Course is endorsed and recommended by America's leading airmen and leading students of aviation, as the most complete, the soundest, clearest and most informative of any Course ever prepared. It teaches you the fundamentals of aviation and materially cuts down the number of hours necessary before qualifying as a flier. Membership in the ASPA, including Silver Wings (pictured below) is but \$1.00. The Complete Home Study Course, including Blue Print of a Model Airplane, is also \$1.00. Show your spirit and patriotism by lending support to this national determination to "Make America Supreme in the Air." Use coupon below—TODAY!

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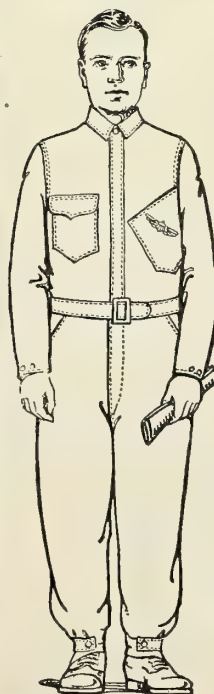
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<b>PORTLAND, ORE.,</b>	<b>474 Glisan St.</b>

*(Continued from preceding page)*

began our overnight hop to Cleveland.

The remainder of the flight to New York was accomplished without trouble. The *Sun God* arrived over New York at 1:30 p. m., Eastern Standard Time, August 18th, and after being refueled over Roosevelt Field, started on its westward flight at 6:30 p. m.

During the night over Pennsylvania, we encountered severe lightning and rainstorms which delayed us several hours. We refueled again at Cleveland at dawn and arrived over St. Paul about 2 p. m., Central Standard Time.

Because of a mishap to our refueler, we were delayed almost until dark, when we proceeded westward on the final leg of our flight. Arriving over Miles City shortly before midnight, having been delayed again by strong head winds and storms which exhausted our fuel supply, and fearing we should not be able to make Missoula, our next regular refueling point, we circled the airport and requested an emergency refueling from Frank Wiley, commercial pilot. Several hours later as dawn broke, eight 5-gallon milk cans of gasoline were transferred to the *Sun God* from an open plane piloted by Wiley, who was assisted by Tommy Mathews.

Missoula was the last refueling point before we reached Spokane. At 2 p. m., Pacific Standard Time, the *Sun God* returned to its starting point, Felts Field, Spokane, Washington. After circling the airport for four hours, and at the urgent request of the backers of the flight, the *Sun God* landed at 6 p. m. after completing the first trans-continental round-trip, ocean to ocean non-stop refueling flight in history. Our time was 120 hours, during which we covered a distance of approximately 7,000 miles. Forty-nine contacts for gas, food and oil were made, by six different refueling planes and crews. Three of those contacts were made under the most adverse weather conditions; i.e., those made in complete darkness at Rock Springs, Wyoming, with the aid of two flashlights and a 20-foot hose. At Aberdeen, South Dakota, refueling was accomplished in a 50-mile gale.

The flight was completed in less than 25 days from the time it was first thought of. It is conclusive proof that an airplane is perfectly at home in its element and can remain aloft day and night for an indefinite period continually traveling from place to place.

It proves too that service facilities are available almost anywhere and that it is possible to receive gas, oil or other articles without landing regardless of the place or conditions.

Our plane and engine were running just as well when the flight ended as when it began. We were both in fine physical condition and could have continued indefinitely with the flight.

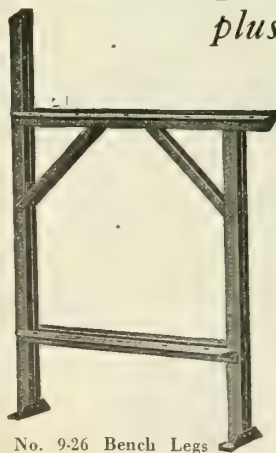
### THE WORLD'S GREATEST SHOW

*(Continued from page 61)*

escape matrimony as long as possible. So that being the case it is up to you girls to continue looking as attractive to us as your mothers looked to your fathers. And you'll never do it in a suit of mechanic's overalls. You never will. Of course, to those of you already married my words are just so much wind—you've got your man and you don't have to keep catching him all over again. But it's the younger girls I'm thinking about. And it is to them that I offer the following suggestions about garments that will be snappy and alluring and yet not get caught in the machinery nor raised by the wind.

*(Continued on next page)*

## Bench Legs that *plus* Production!



No. 9-26 Bench Legs

A VERY popular number, this ANGLE STEEL Bench Leg unit is in great demand in aeroplane shops. Top is 5" wide, and projects 4" on one end. Rigidly built and properly braced. Back leg continues up and extends above top angle a distance of 9". To this may be fastened a back-board; it has holes punched for attaching. Top and girt also have properly punched holes for fastening on of planks. Seven heights from 26" to 36". Top length: 26".

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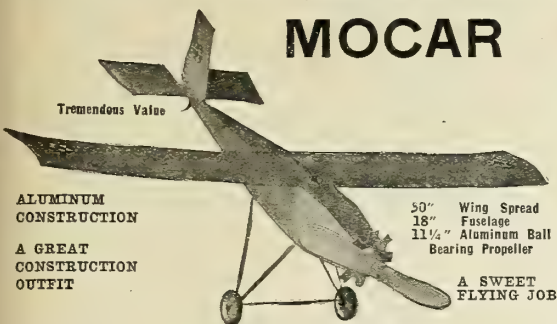
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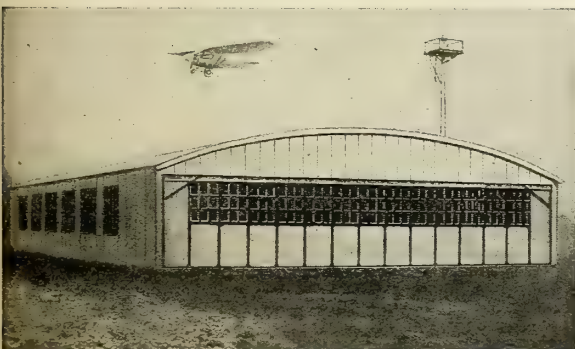
It is a real scale model—great fun to make—wonderful to fly. It will be your pride and joy. And you can fly it, too. It is made to stand the shocks. The Big Mocar construction outfit M-200 is complete with full instructions, mounted on board with all parts marked for easy assembly, rubber-tired wheels, covering material, cement and colors. Pliers only tool necessary.

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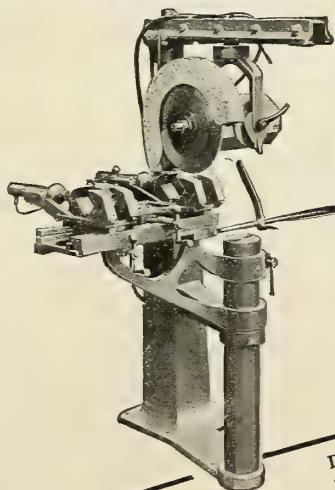
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Homer Milo of Granitville, Mass., won last month's prize with flight of 400 feet distance and 92 seconds duration. Can you beat it?



**EAGLE MODEL  
AIRPLANE CO.**  
DEPT. 10 NORTH-HAVEN-CONN.

(Continued from preceding page)

Instead of these Bedford cord breeches, tough mannish things, why not a little pair of silk panties, preferably pink or blue, such as the ladies of the chorus used to wear when I was a lad, and before Mr. Ziegfeld did away with coverings entirely? Why not? Or why not a one-piece bathing suit? I saw some very snappy one-piecers at Miami last year, any one of which would have knocked the things you girls wore for a row of ash cans. If one girl in that Derby had stepped out of her plane in a white silk bathing suit she'd have panicked the Show, perhaps stopped it. And I don't care what place she might have landed in, she'd have won first prize, or I don't know men judges. They'd have disqualified all the other entrants for hurting the eyes.

And shoes; I saw shoes heavier than the pair I wear. I saw little feet, made for dainty pumps, flopping about inside pebbled brown Oxfords that would have fitted the average small garage mechanic. And stockings: wool ones don't look good on anyone. What we men want you girls to wear are long slinky silk ones, rolled at the knees. And a space of say an inch between the roll and the bottom of the pink silk Teddies adds the little touch we need in order that life may be just a little zippy, just a little bright, just a little warming to the heart. You follow me? As to shirtings, or blousings, or waistings, let it be something silk with a touch of lace, and low in the throat. The feminine touch, you know—the little difference in texture that, should I slip my arm about you in a fatherly way, will let me know that I am not hugging Al Williams in his cotton shirt.

That's the trouble, in a nutshell—you're getting too much like us men. You've taken our job—you're welcome to it—but you've also taken our clothes. Not that we want to be exclusive about the wretched garments. It's only that we want you to be different from us and wear the sort of things in which we like you best, whether you are in the kitchen or in an airplane. After all, you're still women, and we like our women done up in nice wrappings, preferably silk. Now, I've looked you girls over pretty carefully, and my advice is: Get back to Nature. Let the men have their sorry garments—you have better ones of your own. I'll make just one exception to this ukase. Little Elinor Smith is advised to stick in uniform. But to the rest of you, the old army command rings out: "AS YOU WERE!"

Having disposed of the most important part of any female activities—dress—we may dash into a few comments on the flying. And right here is the place for me to take back a few things I've said about the dear creatures in the past. I'm always willing to admit when I'm wrong, for I have no delusions about my infallibility. I used to say that "a woman flying an airplane was like an elephant walking on its hind legs—neither of them do the trick especially well, but I'm surprised to see them doing it at all." Another thing I used to say was that "a woman flying an airplane was about as incongruous as a man doing tatting or fancy work." Well, I was wrong. It was only that I am getting old and feeble and hadn't kept up with the changing times. And I was made just a little bitter when my own wife, who was so gentle she had never even broken a plate over me, suddenly dashed away from the dishpan and leaped into the air—at my expense, and with a derisive wink in my direction. However, I'm coming out of my daze and trying to catch up with militant womanhood; and I am announcing the fact by giving three rousing cheers for the courageous and capable women who flew

(Continued on next page)

OUR CREED



**Y**OU'LL find Aero Supply products used in the construction of all famous aircraft . . . regardless of the size, type or make of plane.

In "record holders" for speed, distance, altitude and endurance . . . in planes whose well-known flights have captured the world's applause as well as in planes you hear less about—the sturdy ships in daily flight at training fields, in sport flying, or carrying passengers, mail and express throughout the land. In short, practically all American planes nowadays are Aero Supply equipped.

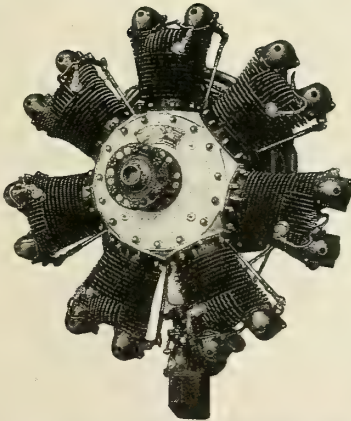
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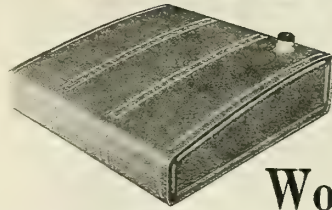
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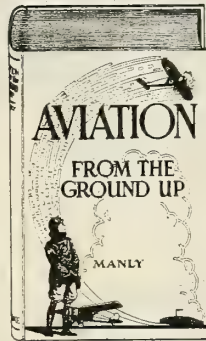
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VI The Gasoline Engine	XVII Handling a Ship
VII Airplane and Engine Characteristics	XVIII Stunts and Maneuvers
VIII Details of Airplane Engines	XIX Parachutes
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XI Airplane Propellers	XXII Aviation Words and Terms—Definitions

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Every part adjustable with the fingers—no tools. Sturdy construction. Soft rubber pads fit the face without air leaks. Accurately ground lenses cure the cause of goggle headache. New wide-angle vision.

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*An AMERICAN OPTICAL COMPANY product*



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**The International Derrick & Equipment Company**  
Columbus, Ohio

Los Angeles, Cal.

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*(Continued from preceding page)*

unaided from Santa Monica to Cleveland. It's too bad they couldn't all get first prize—they were such good sports.

The women flew that Derby as well as any crew of men pilots could have done, and when it came to the banquet and speeches in Cleveland, they did much better than any set of men I have listened to. Of course, that was to be expected. The married ones were especially good at the speech-making, having had more practice than the single girls. Ruth Elder, for example, said that she had landed in a field full of cows. Her plane was painted a bright red, so she prayed, "Oh Lord! Let them all be cows, please!" Ruth was the only girl to insult Cleveland; she mistook Akron for it. She got lost a couple of times, but came through smiling as usual. Ruth rates as one of the old-timers among the girls now—I believe she was the second woman to receive a Private Pilot's License from the Department of Commerce.

The girls went through all the hardships suffered by men in Derbies of this sort. Mrs. Louise Thaden, winner of the heavy plane class said, "It wasn't the flying that tired us out; it was the banquets and things we had to go to." This should be fixed. All toastmasters and chairmen should wear muzzles and all guests should be equipped with sound-proof ear pads. Then one might eat, and while the silent speeches were in progress one might sleep until awakened by the boom of the photographer's flashlight. Somebody ought to work out this idea and force it on entertainment committees. Too often the "entertainment" is merely painful detainment. Mother Tusch, for instance, had to visit the Cleveland Clinic with ear trouble. I told her that's what comes of listening to a speech by Floyd Logan.

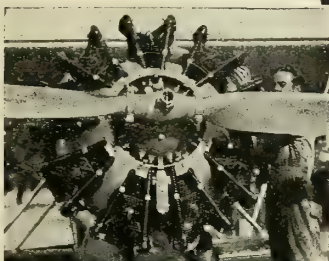
The standing of the contestants is published in another part of AERO DIGEST, so I will not duplicate the list here, except to remark that Mrs. Thaden won the heavy plane derby and Mrs. Omlie the lighter plane derby. All of the contestants gave a wonderful demonstration of good flying and good sportsmanship which should entitle them to admission to the Q. B.'s. But as that is (and for social reasons should remain) a man's affair, it is up to the girls to get up their own organization and keep the men out of it. Mrs. Phoebe Omlie suggests that they form the T.B.'s—the Talking Birdmen. All of the husbands will vote for this plan, having listened to so many home lectures that they carry their own slides. Colonel Lindbergh, when asked if women had a real place in the air, refused to commit himself—he's very hard to catch with these trick questions. But City Manager Hopkins, of Cleveland, answered the question by saying, "And now the air, like the land and the sea, is theirs!"

Just a word in conclusion about the Show itself, for I refuse to confine myself to the Dame's Derby, even if I did qualify for the job of writing it up by drinking tea every afternoon at the Hostess House. That was one of the features of the Show, by the way, my drinking tea. Nobody thought I could do it and survive. But if Sir Hubert Wilkins could stand it, I guessed I could. Sir Hubert was looking well after his arduous labors in the Antarctic, where he lost his razor. Everyone commented on his marked resemblance to Charles Dickinson, of Chicago, who spent his time giving everyone his ideas of the Contest Committee, which apparently was run by those sterling characters, Messrs. Muddle and Fuddle, assisted by Messrs. Shilly and Shally. It didn't seem possible that any others could have got the races tangled up so expertly.

*(Continued on next page)*

*A 110 m. p. h. Propeller*  
cannot do Justice to  
*a 130 m. p. h. plane*

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Fits the "PROP"  
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**T**HE maximum efficiency can only be obtained when the propeller is exactly fitted to meet every individual requirement of the planes. A 110 mile per hour "prop" cannot do justice to a 130 mile per hour plane. There is a loss in performance.

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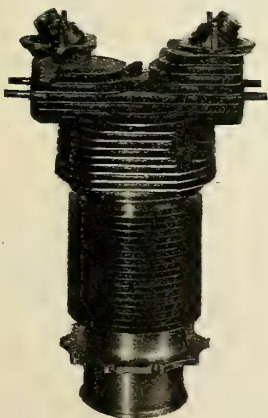
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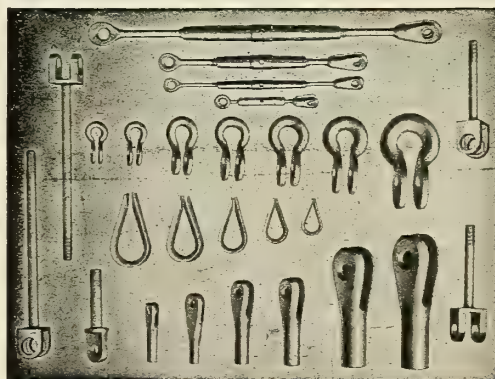


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Price Reasonable

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(Continued from preceding page)

The method of deciding the winners was unique. Contestant's names were printed on hot dogs, which were then thrown violently against the ceiling. The first hot dog to hit the floor carried the name of the winner. If a hot dog stuck to the ceiling, the contestant whose name was inscribed thereon was disqualified for fouling a pylon. In the speed and efficiency races, which are complicated to calculate because of the different factors entering into the computation, a different plan was pursued. The results were tabulated on an adding machine and a calculating machine, taken out of them, and placed in a peanut roaster. When the results were well browned, the whistle blew and out came the results with a bag of peanuts. Everyone except those who had to wait for their money expressed themselves as highly delighted with this plan. The peanuts were very good. However, good as this plan was, in future, to avoid any of the pilots murdering the committee, it is suggested that the contests be taken out of the hands of the local committee, who are well-meaning men, only nobody could get their meaning; and the contests should be run by a professional committee, and paid for by the various races where they function. If this plan is followed, the contests will be run by men who understand the work, and the deplorable jumble at Cleveland will not be repeated. Reports of the results of each day's races were not posted the following morning; many events were not carried out on schedule, causing overlapping; proper rest facilities were not provided for pilots; and delay existed in awarding prize money. Outside of that, everything was fine.

To Jack Berry, who worked day and night to get the field in shape for the races, and to City Manager William R. Hopkins of Cleveland, who supported him in his plans, all credit is due. And for the efficient work of Clifford W. Henderson, Managing Director who staged the show, too much cannot be said. Cliff put on a fine show in Los Angeles and a great one in Cleveland. The few ragged edges, including the inadequate functioning of the contest committee, was not his fault; nor, to be fair, was that any real fault of the committee—they were simply not used to the work and were snowed under to such an extent that it took three snow-plows, run by Major Luke Christopher, E. W. Cleveland and Carl Egge, to dig them out. Floyd Logan, who received much blame for this inadequacy, worked like a Trojan and did his best. And no man can do more. Many times the poor fellow doubtless wished he'd stuck with the OX-5's and the spare parts and left glory alone.

## AIR—HOT AND OTHERWISE

(Continued from page 72)

in every way, with at its head this young, comparatively unheard of genius at the gentle art of making folks sit up and take another look. Come out of the West, not old enough to know exactly what the middle forties mean, Cliff Henderson is a natural phenomenon. When he arrived at Cleveland, he had not been puffed up and pompoused by his Los Angeles success, but he used instead that triumphant experience as a lessonbook which would enable him to make his next one more so—and then some.

Cliff Henderson made history at Los Angeles, and at Cleveland showed that he could profit by it. The whole aeronautic industry applauds, now, the judgment exercised in the selection of Cliff Henderson as the Aeronautical

(Continued on next page)

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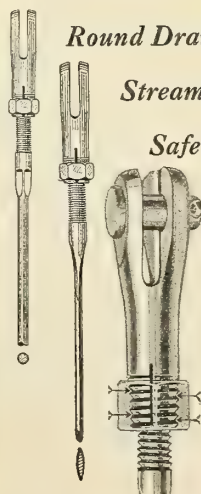
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Round Drawn TIE RODS

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Macwhyte aircraft products are the result of scientific research, engineering skill and practical knowledge of modern aircraft requirements. Their dependability has been proved on hundreds of planes in daily use, in history-making races, in tests of many kinds. That's why you find them used on standard equipment by leading aircraft manufacturers.

*Macwhyte Round and Streamline Tie Rods used exclusively on record-breaking "St. Louis Robin."*

MACWHYTE COMPANY

Kenosha, Wisconsin



(Continued from preceding page)

Pastmaster and Aeronautical Major-General of Showmanship.

The present Assistant Secretary of the Navy for Aeronautics, "Dave" Ingalls (happily at least this one man in the Navy has his hair cut at a barber shop, not sheared at a propaganda bureau) selected Henderson to pull the trick, over much Cleveland opposition, for the city wished to have a local man in charge. Ingalls forcefully remembered that local products are not always tuned up for epochal national jobs. When America originally decided to become discovered, it will be recalled, it selected for the job no bright red Indian, no Native, but imported an Italian resident of Spain. And Cleveland deciding to be discovered as an air center having acted similarly, now is about as well discovered by Cliff Henderson as the continent ever was by Christopher Columbus.

Few seem to have the slightest notion of the magnitude of the Cleveland achievement. The personnel involved numbered at least 10,000, most of whom were local and many of whom patriotically served without pay. This 10-day show had more than bigness. It had something close to grandeur. Over half-a-million people paid admission to the air races, on which the profit, when checked up, undoubtedly will exceed \$100,000. The group of splendidly air-minded citizens who underwrote the whole affair for \$300,000 never were called upon to advance a single dollar. When the show was opened, August 24, there had been an advance sale of tickets amounting to well over \$150,000.

The experiences of Los Angeles and Cleveland show that air races in America will not be liabilities to the cities holding them. Obviously past failures to make money may rightly be attributed to bad management, and that the managing directorate should be made permanent and moved from place to place as show locations are decided on. It perhaps will be recalled by some that such a recommendation was made by AERO DIGEST as a comment on the Los Angeles event.

One of the lessons taught by the Cleveland experiences is that the races should be sanctioned at least two years in advance, so that proper preparations may be made for them. Six or seven months are not enough. The show for 1930 and 1931 should be sanctioned at once to give us all a chance to show what we really can do in 1931.

Another lesson is that the number of races should be cut exactly in half. The idea of a race for every type of plane has proved to be ridiculous. The more important events should be chosen and the others discarded. Imagine automobile races for trucks, tractors, tanks, passenger cars, high cost pleasure cars and, trailing along, special race for Chevrolets and Fords. Or perhaps that should go first, because more people own cars of either of these makes than own those of all the others put together.

Everyone was there: Lindbergh, Eckener, Jimmy Doolittle, Al Williams, Admiral Moffett, Bill MacCracken, Clarence Young, General Foulois, Mayo of Ford's and all the rest. We also had with us, not only the *Graf Zeppelin*, but the *Los Angeles* when we wished to look at something big, and, by contrast, pocket planes under the big top. Crack fliers were on hand from the Army, Navy and Marines. Sir Hubert Wilkins, Governor Cooper of Ohio, Captain Eddie Rickenbacker, Captain Frank Hawks. Let that list hold you for a minute. It is very incomplete, but then, white paper costs so much these days! Harold Pitcairn and Senor La Cerva had their autogiro on the same field

(Continued on next page)



Model C  
Heat Indicator



Model 3015-A  
Heat Indicator  
New  
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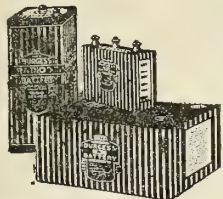
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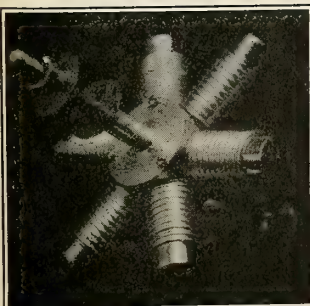
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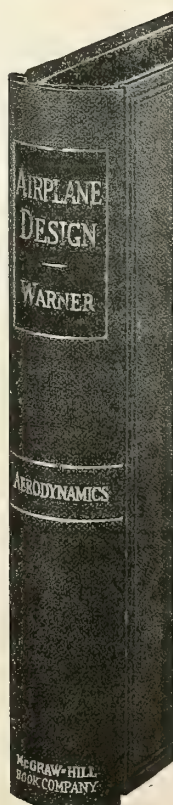
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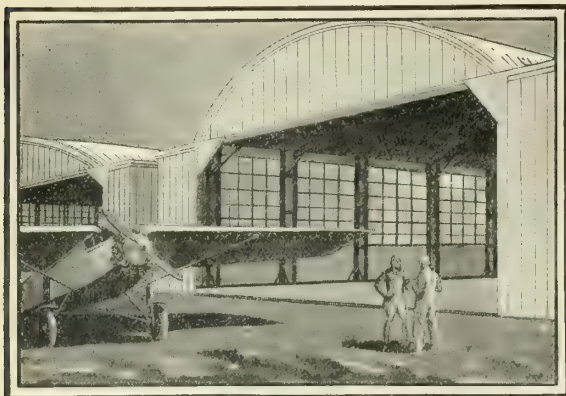
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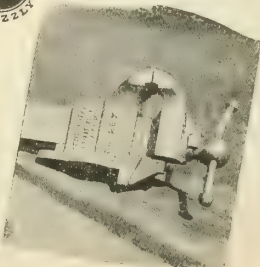
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Lt. Markham of Meriden Airport holding the Parker Vise just before the take-off.



The same Parker Vise after a 1200 foot drop which drove it nearly five feet into the ground.



(Continued from preceding page)

with the great dirigibles. And planes? If Wilbur Wright could only have been there to see to what his great idea has developed! And imagine a grandstand holding fifty thousand people as a background for all this!

Everyone in Cleveland is to be thanked for his (or her) cooperation. The people of the city helped splendidly to make this the greatest show of its kind in the world's history. That matter of high paper cost slips in again to warn me not to list them. But there was City Manager Hopkins, who five years ago bought a landing field for Cleveland against the opposition of nearly every citizen. They thought it was too big. Since then it has been doubled in size and now they kick because it is too small. And there was Mayor Marshall, who backed up the city manager; Captain Jack Berry, manager of Cleveland Airport, who for three months worked at least thirty-six hours daily—his charming wife claims that it was usually forty-eight. She said she hadn't seen him, except at the airport, since Cleveland launched the show.

If you want things done properly about an air show, turn it over to the Air Klan. Those with long memories will recall the bayonets of the Regular Army at Dayton and St. Louis. At Cleveland the unostentatious and efficient policing of the field was in the hands of Major Thomas Herbert and Lieutenant Charles M. Cummings, of the Ohio National Guard. They made no noise and waved no violent arms. They did their job, as everybody did in Cleveland, perfectly but without fuss and feathers. No disorder occurred, owing as much to the uniform courtesy of those in charge of things as to the high class of the attending public. The crowds were not treated as if they might be rowdies, needing armed men to keep them in good order, but were received as guests, worthy of the highest consideration from their hosts.

State Director of Aviation John Vorys gave a full month before the show to ballyhooing the great event in almost every town in Ohio; L. W. Grieve, treasurer of the Cleveland Pneumatic Tool Company, not only gave the movement his time and his money, but used nearly all the employees of his fine plant to further the show's interests. The engineering work was in the hands of J. J. Murray, of Los Angeles, and the hundreds of thousands in attendance can testify to its thoroughness and artistry. Bill Henderson, brother of the Managing Director, who had charge of the advance sale of tickets, saw to it that all cash taken went to the treasury. That's something. Since no contact was possible between ticket-sellers and ticket-takers, no money was thus stupidly lost. Again Henderson profited by his Los Angeles experience.

THAT'S enough about the situation. Now let's go into the show, itself. The races were the greatest of successes. The exposition was a catastrophe and flop. It was demonstrated clearly that the two never should be held at the same time. The races drew the crowd, which, during the fine weather, loved the out-of-doors and the excitement. It is evident that people who go to air races in the daytime, will not go to an air show at night.

The exhibits, of course, were wonderful. There was nearly every type of plane. The auditorium in which the show was held was literally ideal for it. Everything was magnificently planned and ran with perfect smoothness, but the crowd just couldn't be dragged in, even though, ere long, prices were cut in half. The outside exhibition killed the inside show. Free tickets would not have pulled a

(Continued on next page)

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(Continued from preceding page)

real crowd inside.

Let's profit by this. Education is expensive, and we are willing to pay for ours; but we doubt if ever another exposition is held in connection with the National Air Races.

The outstanding social event of the week was the banquet given to the participants in the Women's Air Derby, after their arrival Monday night. Nearly a thousand of the really air-minded welcomed these ladies at the tables. Most of the thousand were not associated in any way with aviation, and that showed the friendship of the public for our industry, when properly led. In contrast was the dinner, later on, of the N. A. A., at which Senator Hiram Bingham (one of him—count 'em!) was the principal speaker. Less than 100 attended. Well, a hundred sufferers in one place is sufficiently patriotic.

### THE EMBATTLED AIR RESERVES

(Continued from page 81)

of this category. But we have reckoned without the military minds that prevail at Mitchel Field.

All of these men, regardless of their classification or recent experience, were lumped together in a mass and required to go through the dreary routine of "checking out" in a PT, soloing for a given number of hours in these same ships and then "checking out" in a "service type airplane." And by the time this latter stage had been reached, half the ships on the field being engaged in meaningless "war" maneuvers with the Coast Artillery, that still thinks it can defend New York, the two weeks of active duty in most cases was drawing to a close. One man in the first camp of the summer, a thoroughly competent commercial flier who was engaged at the same time that he attended camp as an instructor in the flying school at Roosevelt Field, actually was held on "training types" so long at Mitchel Field that he barely was allowed to qualify and get an hour or so on "service types" before the time had arrived for his return to civil life. Yet his chief purpose in attending camp was to re-familiarize himself with the sort of ships he would be called upon to fly in case of war.

Such procedure, of course, is utterly absurd. It destroys morale by revealing the futility of keeping in constant trim as a "Class One" pilot and by building up a belief in the ranks of the Reserve that the Regular Army is apathetic, if not actually hostile, about active duty training and that its attitude is one of "stalling" through an unpleasant duty with the least possible activity or intelligence.

Furthermore, the good that is achieved by calling the Air Corps Reserve to active duty every summer is almost wholly dissipated by the fact that, under present methods, these men are permitted to fly for two weeks and then are forced to forego flying for two months or more. It is the opinion of the Reserve that there lies a serious need of reform. The first camp this year got under way July 7, but, prior to this, Mitchel Field was involved with R.O.T.C. training so that practice flights for the Reserve were "washed out" from approximately the middle of June until the middle of September. This means that every man who went to camp, and managed to increase his proficiency in the air, was denied opportunity of maintaining whatever skill he attained by two weeks intensive training because no Government airplanes were available to him for the next two months (or the preceding two months if he happened to be in the last camp). This situation would be

(Continued on next page)



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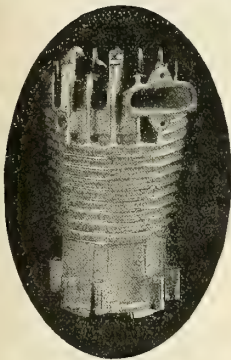
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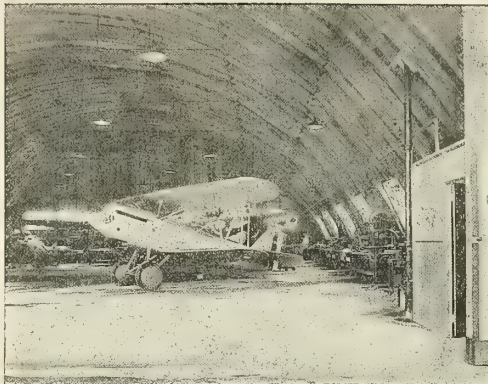


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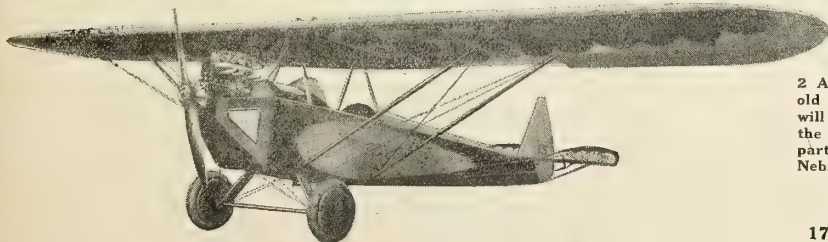
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LOOK FOR



(Continued from preceding page)

greatly relieved if at least one airplane were kept available for practice flights by Reserve officers during the time that their fellows are taking active duty training.

But obviously the outlook is unencouraging if the Army goes ahead with its announced plan of limiting each man to 48 hours flying a year.

This situation is occasioning all the more surprise in the ranks of the Reserve because of the roseate promises held out for the future of this organization not so long ago by F. Trubee Davison, Assistant Secretary of War in charge of aviation. Secretary Davison indicated, both by word of mouth and in the columns of AERO DIGEST, that great things were in store for the Air Corps Reserve and that those who had been faithful by flying whenever they could would be given opportunity to make themselves more and more valuable in the country's national defense plans by being allowed more time in the air and the chance to fly up-to-date machines. At the same time the impression was given that efficiency was to be improved and wasted effort eliminated by weeding out the non-flying personnel of the Reserve whose only apparent interest in the Air Corps was to be promoted to as high rank as possible, strut around in uniform on gala occasions, and keep both feet on the ground at all times.

Italy's attitude toward air reserve officers under the regime of Premier Mussolini stands out in sharp contrast to the present American system. Under a recently inaugurated policy, Italian air reservists who qualify and keep in training over a certain period of time are presented by the government with airplanes, which become the personal property of the fliers to do with as they please as long as they continue flying and render conscientious reports on their time in the air. Even our Canadian neighbors would seem to be better off in this respect than we are, inasmuch as the government-supported flying club idea, which originated in England, has been introduced and is thriving there, with the result that an enthusiastic and highly valuable air reserve is being built up without the formality of military training camps or other red tape.

For the first time in the memory of those who have gone to Mitchel Field for summer training, Reserve officers this year were required to live in tents instead of barracks. This was taken in good part—despite the fact that enlisted men on the same post are now housed in brick quarters—for everyone realized that the place was in the midst of a new building program and that the tents were relatively better than the run-down barracks still occupied by the regular officers of the field. But another innovation was not accepted with so much equanimity.

For the first time in ten years, every Reserve officer reporting for duty was called to account on the basis of his smallpox vaccination and typhoid inoculations. Those who could not produce satisfactory evidence of recent immunization were forced to submit to scratched arms and "three shots against the fever." It marred the pleasure of the camps, and it brought forth maledictions on the heads of those responsible.

"Oh, it's probably regulations all right," ran the complaint, "but why do they have to ring it up after ten years? We haven't been bothered before."

Then it was learned that this particular order had originated "on Governor's Island," and it was decided that this was just another move by "the rest of the Army," to "take it out on the Air Corps."

"Either that," said a cynic, "or it's part of the general plot to make things uncomfortable for the Reserve."



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## THE WOMEN'S AIR DERBY

(Continued from page 62)

whole afternoon during which there was nothing to do, we had our hair washed and nails filed, and we slept. Without doubt, every man, woman, and child in Texas has our autographs. For three hours we did nothing else. The police were powerless to keep the people off the field. We even had trouble getting the gas truck close enough to the ships to pump gas. Thus progressed the Derby.

Going from Midland to Abilene, and from Abilene to Fort Worth, we encountered air so rough that most of us had to fly with both hands. My feet were off the rudder pedal at least a third of the time, and vertical slips were common occurrences. I was hugging Mother Earth from Yuma to Phoenix, and flying wide open for the first time. The mountain tops were above me and the mountain sides all but scraping me, when we hit a hump we hit a hump that was a hump. Off the seat I went, my goggles broken on the windshield. I felt as though I could reach out and pick up a rock lying on the ground. Thereafter, I flew a few feet higher. With those exceptions, the air wasn't bad.

Fort Worth, Douglas, and Wichita were the best organized of the controls. Even details were systematically and orderly taken care of. No wild excitement and running around; no important dignitaries bawling orders; no bustle, no confusion.

We were getting tired and more tired. People everywhere were wonderful and as considerate as possible, but we weren't getting any rest. You know as well as I that a very small portion of the flying is done in the air, and that if you don't check things yourself there is going to be something to go wrong.

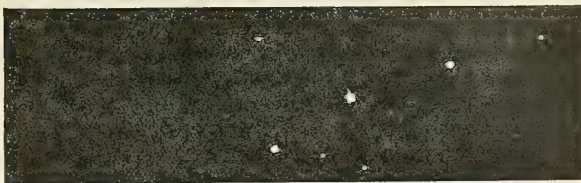
August 25th is a memorable day. We had chicken twice and went to the banquet at Columbus to find we were scheduled for chicken the third time; but some kind soul had arrived from Cincinnati and suggested they give us beef.

At that time I was an hour in the lead, one little hour; and so many things can happen to a motor. A forced landing would of course have cost me the race. "Take it easy; you can cruise over and win the race." I made up my mind to pull back 100 revolutions. Which I did for awhile, but the strain became too great. That Travel Air seemed to be tied—so open went the throttle. The only occasions during the whole trip when I was in the least excited were the take-off at Clover Field and the flight from Columbus to Cleveland.

Of course I am happy to have won first place in the heavy plane class, but I want to leave this last thought with you—every girl in that Derby flew as nice a race, as hard a race, as fast a race for her type of plane, as I did. They are much better pilots than I can lay claim to being. Before we started, someone asked what I thought the deciding factors would be. I answered, "a third 'the breaks,' a third navigation, and a third the fastest ship." I had "the breaks" and the fastest plane. My wish is that we all could have come in first, because we all deserved to.

All in all, the Derby was an enjoyable affair. None of us would have missed the experience for a large sum of money. I think we would be willing to go again next month. Personally, I am sorry it is over, and yet I am glad too. To the women who flew I pay tribute. I think we have proved that we can fly as long, as hard, as consistently, and as well as the men. And we haven't had the experience, nor the thorough training—remember that!

The only suggestion I have to offer is that next year there be a woman pilot on the race committee.



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## ONE DAY'S NEWS

(Continued from page 92)

which was also good enough to fly, though too fast for the engines, pilots and flying fields of those days. Then he went to engineering college and did no more building until he reached the age of 23, at which time he designed and built a three-engined bombing plane, the first of its kind built in Spain and possibly the second three-motor job in the world. The plane was successful, but crashed at last in a bad flight, and it was this accident that started the young inventor on the ten years of experiments which brought the Autogiro at last to America.

There ought to be encouragement in this true story for all those youngsters who are spending their spare time and patience at a workbench, building models and trying all sorts of experiments which won't work. Not only are they having an elegant time, but here and there one of them is on his way to some real discovery. It may be a long road, but only those who get started can expect to finish somewhere. Some of the sweetest little inventions and most profitable patents in radio came out of the same sort of tinkering.

At the same time, I'm not recommending any of the boy

friends to start jumping off the porch roof in gliders made of kindling wood and a couple of father's old shirts. The safety factor in homemade gliders is pretty low, and you can have as much fun with a good deal less expense and argument with the family by following the work of those who are still experimenting with gliders in this country and elsewhere. If you must have excitement and a chance to break something, go out for the football team.

And speaking of the day's news, football is just beginning to be a good second to the air news in the family newspaper. In my private opinion—in which I have company here and there—football is the finest game on earth. But it got that way only after surviving a fair share of criticism. Back in the days of Henry VIII, Sir Thomas Elyot expressed himself rather vigorously about "football, wherein is nothing but beastlie furie and extreme violence, whereon proceedeth hurte, and consequently rancour and malice do remain with them that be wounded."

It seems that this gentleman didn't care for the game. But if anybody argues too loud and long that aviation can never amount to anything because so many have been hurt at it, you might ask him what he thinks about football. Or you might just point to the news of the day and let it go at that.

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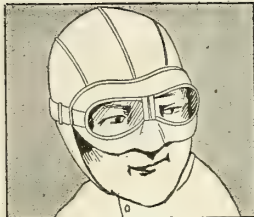
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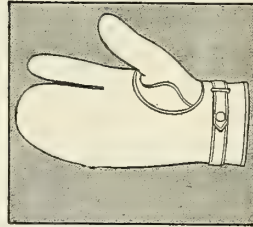
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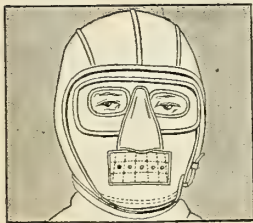
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All-purpose helmet, made for the all-weather flyer. Absolutely windproof. Flaps fasten comfortably under the chin and helmet fits snugly against cheeks. No. 350—Chocolate Brown Glove Leather, with Beaverized Sheepskin lining, \$5.00. In ordering specify head size.

The eight seasonal articles described above are a few of the many fine values in the new A. A. Catalog. Hundreds of other aviation needs are listed. And in many cases the prices establish "new low altitude records" for high quality merchandise. The coupon at the right is for convenience in ordering.

AIR ASSOCIATES, 5300 West 63rd St., Chicago; or Garden City, N.Y.  
Please ship me at once the following items as advertised in AERO DIGEST:

..... \$.....  
..... \$.....

I enclose remittance for full amount, less 2% cash discount — OR—I enclose herewith 25% of the total value of the order and agree to pay balance C. O. D.

Name .....

Address .....

City..... State.....

P. S. Don't forget to include a copy of your new catalog

# ASSOCIATES INC.

EXECUTIVE OFFICES

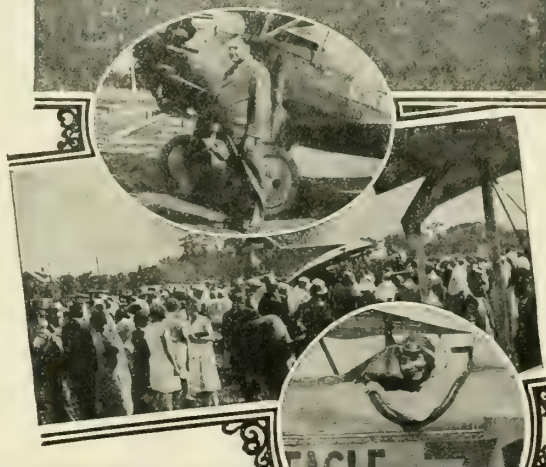
535 Fifth Ave., New York City

MAIL ORDER DEPARTMENTS

Garden City, N.Y.; and 5300 W. 63rd St., Chicago



# AMERICAN EAGLE Goodwill tourists greeted by 500,000 People in 6 Weeks . . . . .



The American Eagle Goodwill Tourists en route. At the top, a crowd of New Yorkers inspecting the Wallace Tourplane, American Eagle's cabin monoplane. E. E. Porterfield, Jr., president of American Eagle, with the Tour in Syracuse, N. Y. Next, reading down, is shown a crowd greeting the Tour in North Adams, Mass. Miss May Haizlip, one of the seven women transport pilots in the United States, has been a featured flier on the Tour. The Goodwillers in Elmira, N. Y., reading left to right: H. S. (Jack) Lowe, Charles Blosser, Erle H. Smith, Hart H. Bowman, Larry D. Ruch, Leon Brink, J. E. Bowen and Don Walling.

AMERICAN Eagle's Goodwill Tour, a flight of six of the various types of airplanes manufactured by the American Eagle Aircraft Corporation, Fairfax Airport, Kansas City, Kas., is en route visiting all of the major airports in the United States.

The Tour thus far has visited airports in the East, New England and Middle Western states. Everywhere, the American Eagle Tour is being greeted by thousands of airminded folk, all interested in noting progress in development in aircraft.

E. E. Porterfield, Jr., president of American Eagle, estimates that thus far on its schedule, the Tour has been brought before more than a half million persons.

Valuable technical data on the performance of both the planes and the motors is being assembled by representatives of the company's engineering staff and the motor manufacturers whose engines are being used.

Miss May Haizlip, a contestant in the women's derby, and Larry D. Ruch, chief test pilot for American Eagle, have been the outstanding attractions as to pilots.

Countless features make American Eagles the outstanding planes of today. Six of these features are of particular importance. Read them over carefully.

- 1—Airworthiness.
- 2—Stability and maneuverability built in.
- 3—Eye value second to none.
- 4—Assured replacements—there are no obsolete American Eagles models.
- 5—Deferred payments for those who can qualify.
- 6—A complete line of aircraft—planes for every purse and purpose.

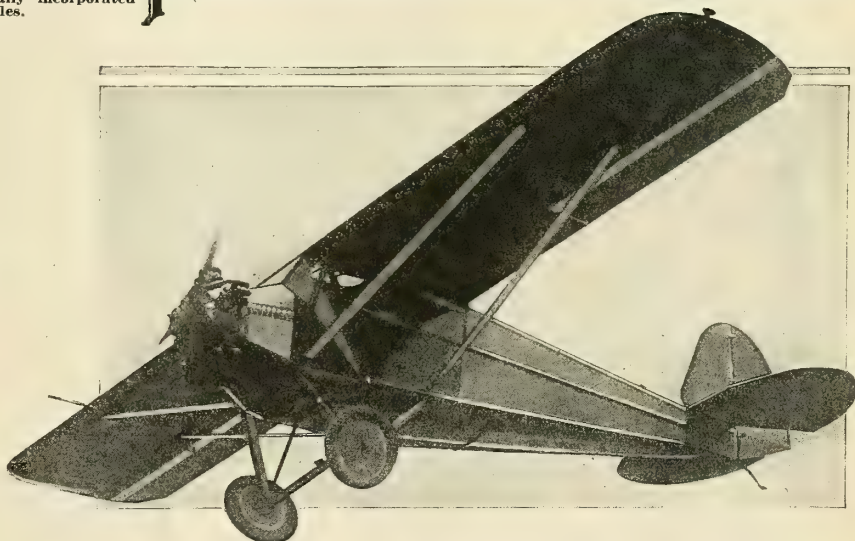
Prices range from \$3,195 to \$7,995. Convenient service points assure speedy replacements. And remember—there are no obsolete American Eagle models.

**AMERICAN EAGLE**  
AIRCRAFT CORPORATION  
FAIRFAX AIRPORT, KANSAS CITY, KANSAS



**“We know a  
Lawyer who has  
made 133⅓ per cent  
on his investment  
during the first year  
of this interesting business”**

American Eagles are built by fliers for fliers. E. E. Porterfield, Jr., president of the American Eagle Aircraft Corp., as a pilot makes rigid demands of an airplane and these are, naturally incorporated in American Eagles.



Rather surprising, isn't it—that an airminded lawyer should actually make 133⅓ per cent on his original investment during the first year of his flying business. Yet, that is just what happened, and it is being done by men of foresight and business judgment in many similar instances.

The buying of an airplane should not be done altogether for the pleasure one gets out of it. There is an easy way to combine pleasure with unlimited profit. The entire personnel of the American Eagle Aircraft organization plus the advice and counsel of prominent business and professional men has devised a unique and extremely profitable plan which will enable the American Eagle purchaser to actually realize a profit of many times his original investment.

This proved merchandising plan, plus the many other features American Eagle offers—deferred payments;

service at any point in the United States; assured replacements, (there are no obsolete American Eagle models) make American Eagle's proposition to you one of utmost interest.

American Eagles have long been known not only for their stability, airworthiness, safety and dependability, but also for their ability to make money for their owners. The American Eagle franchise offers you a new, yet proved plan of merchandising and there are territories now open which will prove unusually profitable.

Send in the coupon for full details concerning this new way to make Dollars with American Eagles.

**AMERICAN EAGLE**  
AIRCRAFT CORPORATION  
Fairfax Airport, Kansas City, Kansas.

American Eagle Aircraft Corporation,  
Fairfax Airport, Kansas City, Kansas.

I am interested in your new plan of merchandising. Please send me full details.

Name.....

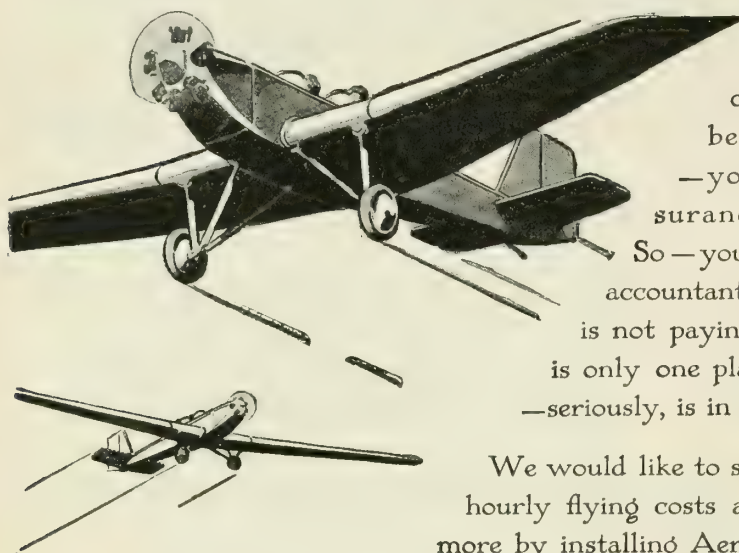
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City.....

State.....



# ARE YOU UP IN THE AIR ABOUT COSTS?



**Y**OUR instruction charges are based on so many hours of student flight. Each hour must bear its ratio of fixed charges—your rent, taxes, payroll, insurance, and many other items. So—you don't need a certified public accountant to tell you that if your school is not paying the profit it should—there is only one place for the leak—and that—seriously, is in the air.

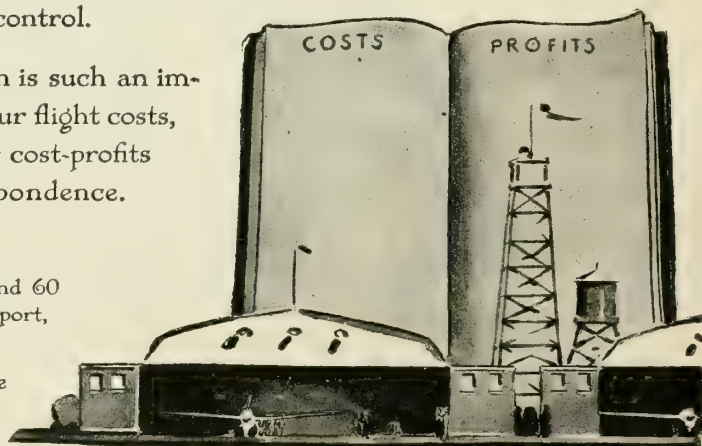
We would like to show you how average hourly flying costs are reduced 30% or more by installing Aeromarine planes as standard equipment. Their economy extends to operation, minimum of maintenance, ground handling and hangar space.

The AKL-25 is the ideal light plane for training and for sport. Powered by the famous, dependable Salmson 40 horsepower, nine-cylinder radial,—or by the equally well known, sturdy LeBlond 60 horsepower, five-cylinder, radial engine (\*) ... these planes are built to stand rough handling and to win friends for your school by their ease of control.

Since economy of operation is such an important factor in reducing your flight costs, we would like to take up your cost-profits problem with you by correspondence. Write us today.

(\*) The AKL-60, powered by the LeBlond 60 h. p. engine, sells for \$3500, flyaway, Keyport, N. J.

Equipped with pontoons and powered by the LeBlond engine, the AKL-60 sells for \$4500, flyaway, Keyport, N. J.



## AEROMARINE KLEMM CORPORATION

PARAMOUNT BLDG. · 44th STREET AND BROADWAY · NEW YORK CITY



# "Flying... by paper patterns"

"CONTACT!" cries our Hero—the four blades of his trusty Westinghouse shoot back a blast of air.....and the Paper Pattern Pilot is off on a flight of fancy, from which he will alight to find the electric bill due.

Flights of fancy don't make fancy flyers, but still that seems to be the idea a few people have about a home study course in Aviation; for every now and then some doubting Thomas writes in and wants to know just how in blazes we expect to teach flying by correspondence.

Truth is we don't! It takes a man with a dual control ship to teach flying—what we teach is *groundschool*, the *prerequisite for flying*. We teach serious-minded men all the basic facts and figures about Aviation: Theory of Flight, Principles of Construction, Materials, Rigging, Repairing, Maintenance of Motors, Instruments, Aerodynamics, and all the rest of Aviation's essential ground-work. We teach about lift and drift, how stagger avoids interference....in short we explain *why* an airplane works,

and we tell what to do when it won't. We teach a thorough, basic knowledge of Aviation that every flyer and every ground-worker *must* have to perform his job intelligently.

And it is bringing *results* for our many graduates in the shape of big salaried ground jobs, and big reductions in tuition at accredited flying schools.

There's nothing experimental or impractical about it. The course is written and administered by a staff of experts headed by Walter Hinton, Pilot of the NC-4; and a nation-wide employment service, under the same direction, is busy filling real jobs with graduates.

On the ground and in the air they are reaping a hundred-fold the advantages of entering Aviation with the *right* training. Men who found out about Hinton's ground-course only a few months ago are cashing in BIG today.

Let the coupon bring you Hinton's Free Book, "Wings of Opportunity"—learn the FACTS about this training and see for yourself how it has started hundreds of men on the road to success in Aviation.



**AVIATION INSTITUTE OF U. S. A.**  
1115 CONN. AVE. WASHINGTON, D. C.  
WALTER HINTON, PRESIDENT

I'm ready to learn the FACTS about my opportunities in Aviation and the facts about your famous home study course. 402-A

Name ..... Age.....  
(must be 18)

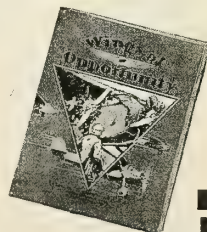
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## Course Gets Results

"Three months ago I decided that one could not be taking much of a chance in sending for a course backed by Hinton's name and reputation. After passing examinations on twelve lessons I felt ready for a job. I reviewed 'Commercial Aviation,' 'Aircraft Engines,' 'Principles of Flight,' 'Aviation Terms and Definitions,' and the 'Aviator's Language,' and set out. Within two hours I had landed a position with the AERONAUTICAL CHAMBER OF COMMERCE OF AMERICA, right in the very center of the aviation industry. Other lads had applied here and been turned away, but when I got there with *Aviation Institute Training* sticking out all over me, an opening was created for me. Anyone wishing verification will find me there happily at work."—Albert W. Reimer, 1721 Gates Ave., Brooklyn, N. Y.

## Soloed in Four Hours

"After finishing your text No. 25, 'Practical Flying Instructions,' I went down to the Washington Airport and applied for student flight training. What was the outcome? At the end of four hours, I soloed. Think of it! *Soloed with only four hours of flying instruction*. This alone proves that the few extra hours of study I put on your course were not only not lost, but well worth three times the price you ask for it. Attached is a clipping from the 'Washington Daily News' that backs up every word I have said. Thanking you again for all you have done for me, I remain a booster for the A. I. of U. S. A."—Dalton E. Ervin, 1216 Kennedy Street, N. W., Washington, D. C.



**FREE BOOK**

"Wings of Opportunity" is a Free Book that tells you just where your opportunities lie in Aviation today, just how to take advantage of them—shows you how you can take the road to success that hundreds of others are taking. If you are 18 or over, don't miss this chance to get your copy Free.



FIRST AROUND



THE WORLD



## Man Made Sinews... Tough and Strong

IN THIS day of mass production machinery, and of jigs and dies, man-power is still the important factor in production! It is not the welder's torch, his jigs and dies nor his rod that creates the perfect weld. *It is the man!* Nowhere else is true craftsmanship so vitally important than in the production of aircraft. The tremendous stresses imposed by terrific speed and multiplied by maneuver must be overcome with inbred strength to spare.

Engineering can plan such strength. Proven quality materials can assist in attaining it, but a man, master of his tools must by his own consummate skill build it in!

Douglas emphasizes craftsmanship of a new school; a craftsmanship that delights in the mastery of production machinery, and still retains the pride in workmanship characteristic of the old school. Through such emphasis, Douglas planes develop man-made sinews strong and tough that carry them through, time after time, proclaiming the fact... *Douglas Means Dependability!*

DOUGLAS  
AIRCRAFT CO.  
INCORPORATED  
*Santa Monica California*

# Learn *FLYING*



*from the flying school book*

**only \$1.00**

## NOTICE TO FLYING SCHOOLS

YOUR students will solo in one-third less time and will be better fliers at the end of their training if they read "The Modern Airplane" before taking instruction. Prices to wholesale users on request.

YOU can fairly feel the increasing enthusiasm in flying. This mighty means of lightning-like transportation is playing an ever larger part in our lives. Whether or not you intend to fly, the quickest way to grasp this important subject is to read the new plain English book, "The Modern Airplane." Its 128 pages and 49 illustrations take all the mystery out of Flying. Use coupon below.

### ----- USE THIS COUPON -----

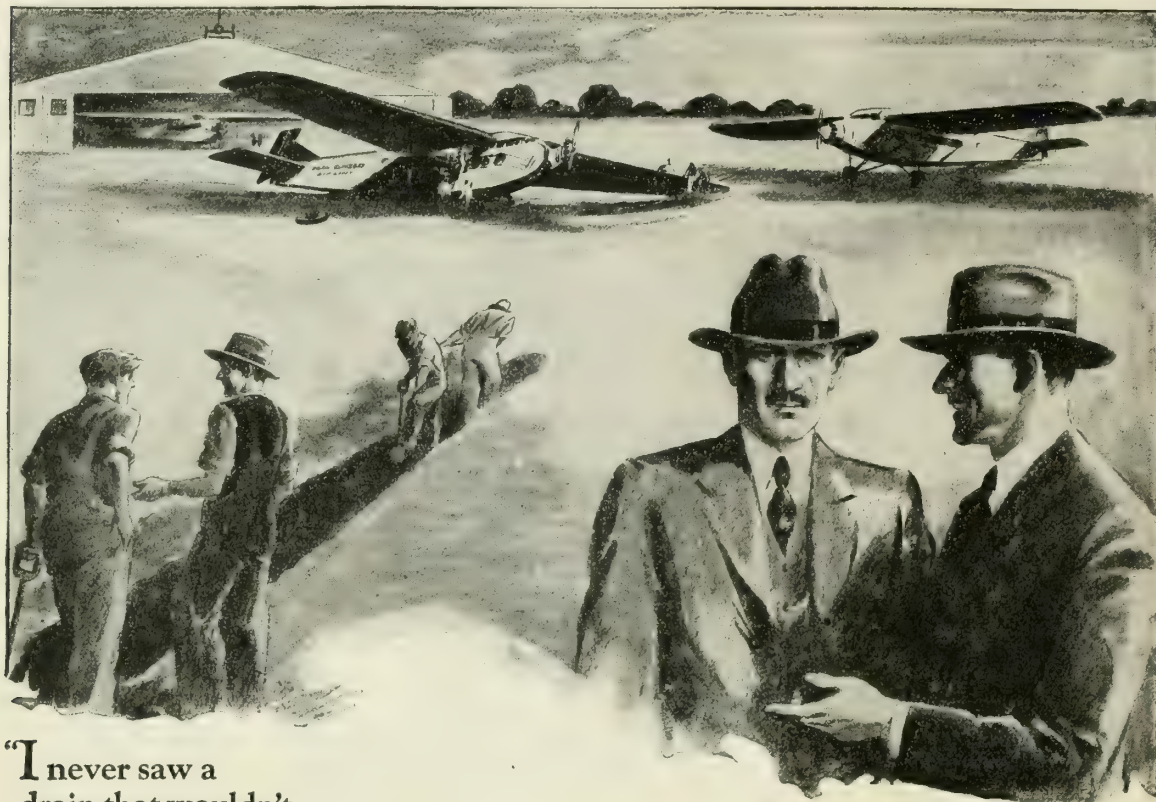
ROTH-DOWNS AIRWAYS, Inc.,  
2508 University Ave.,  
Saint Paul, Minn.

Here's my dollar. Rush me postpaid a copy of "The Modern Airplane."

Name (Print) .....

Address .....





"I never saw a drain that wouldn't break up in Airport Service"—Then he tried Corrugated Pipe!

**L**OADED gasoline trucks cross the landing field . . . rollers crunch their way over it . . . planes land with an impact of several times their actual weight. All of these forces are transmitted to structures below the surface of the field.

. . . And broken drains . . . leakage . . . pools . . . soft spots . . . follow—unless the drains have been especially designed to meet these severe conditions. Often broken landing gears or more serious accidents result.

When Armco Perforated Iron Pipe is specified, these troubles cease. Repairs

are no longer required. Not even the crushing effect of rock backfill dropped directly on the pipe, nor the swelling of wet or frozen soils, diminishes its effective drainage service.

Airport officials realize that adequate drainage is of first importance in making landing fields **SAFE**. And they are learning more, day by day, of the dangers that lurk in soft wet areas and sink holes.

Let us tell you more of this sturdy, efficient airport drain pipe. Complete information cheerfully supplied . . . without obligation.



Armco culverts and drains are manufactured from the Armco Ingot Iron of The American Rolling Mill Company and always bear its brand

ARMCO CULVERT MANUFACTURERS ASSOCIATION • Middletown, Ohio

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**ARMCO** perforated **PIPE**

**Use flexible pipe - it cannot break!**

**FULL  
POWER  
AFTER  
402  
HOURS!**

**COMET  
ENGINE CORPORATION**

215 SOUTH DICKINSON STREET  
MADISON WISCONSIN

Mr. Albert W. Wenzel  
U. S. Hammered Piston Ring Co.  
Paterson, New Jersey

October 8, 1929

Dear Mr. Wenzel:

We have just received a report from one of our service representatives that will be of interest to you.

In making some minor changes on our old engines to bring them up to date, he reports having inspected five engines which have piled up a total of 2,063 hours time, an average of 402 hours each, without overhaul. All engines had over 308 hours, and two had 439 hours. The engines were up to full power when taken out of service for inspection. Our service representative reported all engines and cylinders in wonderful condition.

In view of this excellent performance, it is our intention to continue to use your rings, and we wish to advise you that we are going to produce this engine in much larger quantities in our new Madison plant than was possible heretofore.

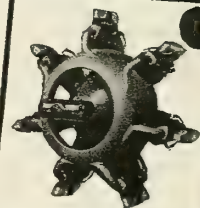
Yours very truly,

COMET ENGINE CORPORATION

*J. H. Geisse*

Vice President of Engineering

John H. Geisse/ehp



**U. S. HAMMERED PISTON RING CO., PATERSON, N.J.**

**U S  
SPECIAL  
AVIATION  
PISTON  
RINGS**



**U. S. SPECIAL  
AVIATION  
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TAPERED-SIDE  
EXPANSION  
RING**





**BACH AIRCRAFT COMPANY, INC.**  
VAN NUYS, CALIFORNIA  
SCHLEE-BROCK CORP., DETROIT, EASTERN DISTRIBUTORS



Concentration of the aircraft industry here assures constant, adequate supply of expert labor.

25 Aviation Schools now training over 2500 students.

Building Costs are low.

Hydro-electric power, natural gas and fuel oil, and abundant water... all at low cost.

Southern California climate makes living conditions ideal and all labor more efficient.

# 355 DAYS of SUNSHINE

The Aircraft Industry of America is centering in Los Angeles County because flying conditions and other important factors here offer unquestionable advantages which are not afforded elsewhere.

U. S. Weather Bureau Reports (50-year record) show an average of 355 days in the year when the sun shines here. Every authority knows the significance of this to the success of the aviation industry.

Meteorological surveys show many other similar natural advantages... greater visibility, minimum wind prevalence and velocity, freedom from electrical storms, absence of snow, infrequency of rain, year 'round equable climate, no extremes of heat or cold.

More than 50 airports and landing fields here now...terminus for 18 air transport lines including 4 transcontinentals.

*Air-Minded*  
**LOS ANGELES**  
**COUNTY**

Detailed information regarding aviation industry opportunities in Los Angeles County may be had, without obligation, upon request to Industrial Department, Los Angeles Chamber of Commerce.





# JUDGMENT

**I**N THESE DAYS of hectic competition in the air, sound business judgment is just as important as engineering skill and experience. That is why the background of the Buhl Aircraft Company—almost a century of recognized leadership in the many fields with which the name has been identified—assures you that the future of Buhl Airsedans will be as brilliant as the present record they are making above the clouds. Several attractive dealer franchises are still available.



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Porter-Hughes Aircraft  
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Mamer Flying Service  
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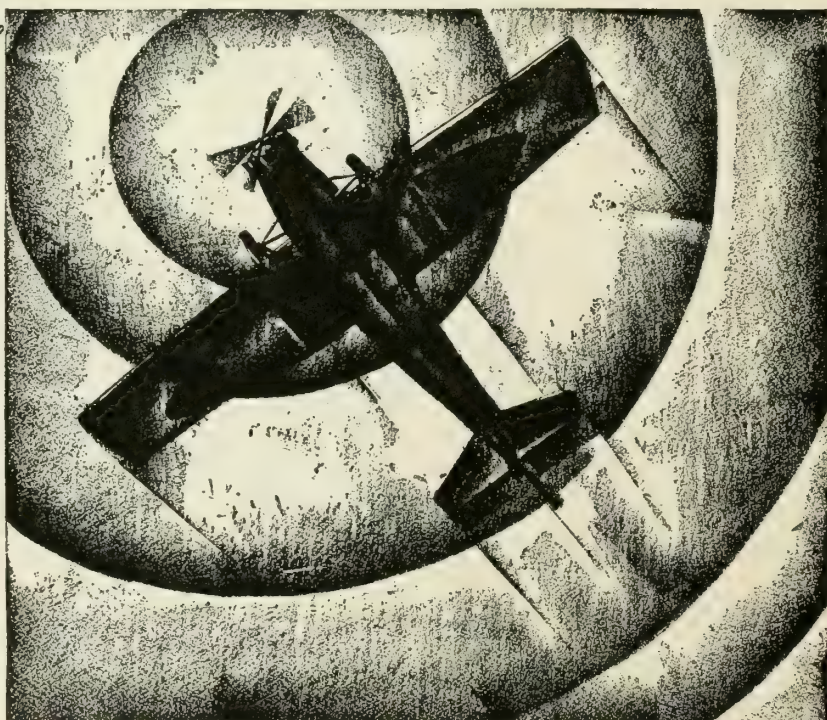
### EASTERN CANADA

National Air Transportation, Ltd.  
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### MANITOBA,

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**BUHL** *Aircraft Company*  
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# Speaking of Reliability..

**A Robin tours**

**101**

**CITIES**

**46**

**STATES**

**12,000**

**MILES**

**Always on  
Time**



*For short or long distance travel over established air lines or just cross-country . . . you'll find Robins are doing their daily work . . . thoroughly . . . steadily . . . with a minimum of servicing.*



*No better cabin plane than the Robin is made for the severe hour after hour strain of instruction flying.*

A CURTISS ROBIN recently covered the country on a scheduled business trip. The itinerary called for the visiting of 101 cities in 46 states . . . surely a complete coverage of the United States.

Naturally all kinds of weather . . . every flying condition . . . every type of airport were encountered. Desert heat and mountain cold . . . fair weather and storms. No more complete and thorough test could be devised to show the flying and endurance qualities of a plane and engine.

And throughout this whole trip the Robin was on scheduled time on

every landing and every take-off.

There were no forced landings . . . no engine trouble . . . and the only replacements were two tail skids.

Yet this performance is just one of many that Robins all over the world are making daily. Outstanding proof of the remarkable dependability and operating economy of these sister ships of the St. Louis Robin, the holder of the World's Endurance Record.

If you'll fly a Robin and subject it to any test you want, you'll understand why it's the best all-purpose, all-weather ship in its price class—without reservations.

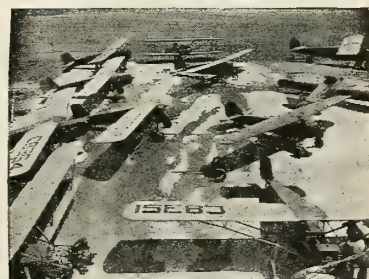
The ruggedness of construction, yet beauty of design . . . inherent stability . . . high visibility, and cabin comfort and appointments breed confidence and enthusiasm in pilot and passengers alike.

A word from you and complete information about the Robin and the location of the nearest Curtiss base will reach you immediately. At the field you can see it . . . and fly it. Write Department 12, Curtiss-Wright Flying Service, 27 W. 57th St., New York City.

Sales agents for Curtiss-Robertson Airplane Mfg. Co., Curtiss Aeroplane and Motor Co., Incorporated, Ireland Aircraft, Incorporated, Moth Aircraft Corporation.

## ANNOUNCEMENT

Curtiss Flying Service is now a part of Curtiss-Wright Corporation, the recently announced amalgamation of Curtiss and Wright interests. Henceforth, Curtiss Flying Service will operate under the name of Curtiss-Wright Flying Service.



*Inspecting and servicing a fleet of Robin cabin planes at one of the 40 Curtiss-Wright Flying Schools.*

# CURTISS-WRIGHT FLYING SERVICE

A DIVISION OF CURTISS-WRIGHT CORPORATION

*"World's Oldest Flying Organization"*



# APPROVED . . . .

BY THE U. S. DEPARTMENT OF COMMERCE

The Spartan School of Aeronautics is one of the few American schools of aviation with official approval and recognition from the United States Department of Commerce. This means that the Spartan school has maintained high standards in both policy and practice. The Spartan course is complete, instructors are men of exceptional character and ability; equipment and facilities meet the most exacting requirements. Spartan is one of the few schools attaining that point in development necessary to such distinction.

## SCIENTIFIC TRAINING

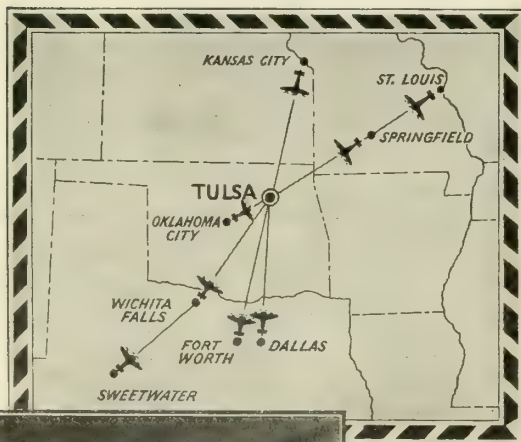
COMPLETE TO THE SMALLEST DETAIL

Subjects covered in the ground school include: Air Commerce Rules and Regulations, Nomenclature (Aeronautical Terms), Airplane Theory and Shop, Motor Theory and Shop, Navigation, Meteorology, Parachutes, Radio, Instruments, Advertising, Sales, Factory Methods. (All ground instructors licensed by U. S. Department of Commerce.)

FLIGHT EQUIPMENT AND TRAINING . .  
Modern commercial ships insure flight

instruction on schedule every day the weather permits. Spartan maintains reserve planes in addition to those in daily service and all ships are powered with radial type air-cooled motors.

The Spartan school is fully equipped for cross-country night flying in cabin or open cockpit planes. All flight instructors and planes licensed by U. S. Department of Commerce.



S. A. F. E. operates nine tri-motored Fords. One of them is shown here taking on passengers and baggage for the trip to St. Louis from Tulsa.



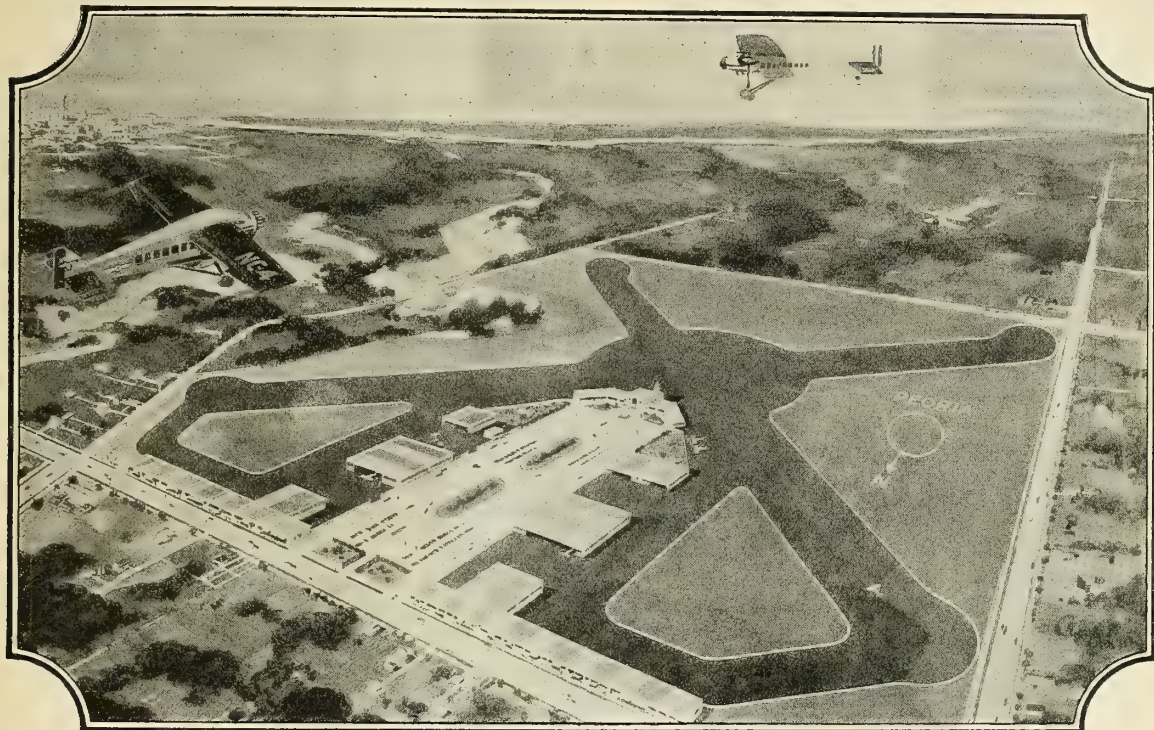
### FREE AIR TRANSPORTATION

Southwest Air Fast Express is one of the principal passenger-carrying lines in America, operating a fleet of tri-motored Ford planes throughout the southwest. By special arrangement the Spartan school will pay the air transportation fare from any city shown on the map below to Tulsa, via S. A. F. E., for any student who enrolls in the Transport Pilot or Limited Commercial course at the Spartan school. For those enrolling in the Mechanic's or Private Pilot course Spartan will pay half the air transportation fare from any city shown on the map.

Write for your copy of 32-page catalog, "Training That Produces Natural Pilots," and information concerning our offer to pay the air transportation fare for students enrolling in the Spartan school.

## SPARTAN SCHOOL OF AERONAUTICS

TULSA, OKLAHOMA



*Airport design by Austin for E. B. Cole, Inc., Peoria, Illinois.*

## Peoria Prefers *Airport Experience*

WHEN E. B. Cole, Inc., of Peoria, Illinois, decided to provide an airport with up-to-date facilities for flying activities in that community, the airport engineering experience of the Austin Company was called upon to insure the project being handled right.

In this vast new field of engineering, where the sum total of all experience is still relatively small, wisdom suggests the employment of an organization which has had a real background of successful experience on a national scale. Large resources and unusual facilities are also necessary.

Austin Airport Engineers have handled the complete layout and design for important air terminals in nearly a score of cities from Coast to Coast. Looking at the future of air transportation, this organization is planning ahead so that the large investments in airports may be increasingly valuable.

In addition to airport design and construction, Austin designs and builds aircraft factories, hangars, and other aviation structures.

With offices in 16 cities, including six on the West Coast, this company is prepared to serve you quickly.

*For information on Airport Surveys and Reports, or any aviation building project, phone the nearest Austin office, wire or send the memo.*

## THE AUSTIN COMPANY

*Airport Engineers and Builders • Cleveland*



New York Chicago Philadelphia Detroit Cincinnati Pittsburgh St. Louis Seattle  
Portland Phoenix The Austin Company of California: Los Angeles, Oakland and San Francisco  
The Austin Company of Texas: Dallas The Austin Company of Canada, Limited



Memo to The Austin Company, Cleveland—We are interested in ☐ Canopy Doors ☐ Hangar.....x.....ft. clearance. ☐ Airport (Municipal) (Private) containing.....acres. ☐ Factory approx.....sq. ft. Name.....  
Position.....Firm.....City.....AD 11-29



# VALUE



## **HISSE "A" 150 H. P. \$3250 Flyaway Factory**

The standard Hisse "A" EAGLEROCK with government overhauled motor has performance comparing favorably with ships selling for twice as much. For advance training, cross-country work and general commercial flying, it has no equal in economy and low first cost. A down payment of \$1300 places it in your possession and you pay twenty semi-monthly payments of \$107.25 from its earnings.

## **WRIGHT J-6 165 H.P. \$5597 Flyaway Factory**

Powered with the Wright J-6, 165 h.p. motor the EAGLEROCK may be purchased for \$2238.80 down and twenty semi-monthly payments of \$184.71. It is popular because of its performance, smoothness and small gas consumption. Those who want flying ability and economy in the medium price class will appreciate this EAGLEROCK.

## **COMET 150 H.P. \$5247 Flyaway Factory**

Beautiful lines, marvelous climbing ability and economical operation make the Comet motored EAGLEROCK an ideal plane for the sportsman, the passenger hopper, or the school operator. Convenient payments of \$2098.80 down and \$173.16 semi-monthly for ten months make ownership easy.

## **LESS OX-5 MOTOR AND PROPELLER \$2,000 Flyaway Factory**

EAGLEROCK first won its popularity with the reliable OX-5 motor. Install one in an EAGLEROCK and you have performance, economical operation, and low first cost that is unequalled. With your own motor, \$800 down and twenty semi-monthly installments of \$66.00 you have a completely equipped EAGLEROCK capable of earning a substantial income.

Less Hisse "A" or "E" motor and propeller, factory . . . \$2237.

Powered with the Kinner 100 h.p. motor the EAGLEROCK sells at \$3907 flyaway factory. In visibility, ruggedness, performance, ease of handling and normal control in all positions, it is close to perfection. It is a low cowling job and an ideal ship for both student training and commercial work. \$1562.80 down starts this airplane earning income for you and you may pay the balance in twenty semi-monthly installments of \$128.94.

## Convenient Time Payments

**Permit Your Airplane to Pay for Itself  
from Its Earnings**

VALUE! New low prices on EAGLEROCK biplanes offer greater value than ever before. You may choose the airplane powered by the motor best suited to your requirements and at the price you wish to pay. You acquire a completely equipped EAGLEROCK, embodying all the features of comfort, economy and performance that have made this airplane popular.

Under the A. A. C. Time Payment Plan you can pay for the plane from its earnings. You pay 40 per cent of the flyaway price down and the balance in as many as twenty semi-monthly installments. The finance charge which includes all interest is 10 per cent of the unpaid balance. No insurance is required.



403 Alexander Industries Bldg.  
COLORADO SPRINGS, COLORADO

# ALEXANDER EAGLEROCK



## THERE IS ONE BEST WAY TO CERTAIN SUCCESS IN AVIATION!

A frank talk to young men who seek fortune and fame in the most fascinating of careers—flying

**T**HERE is a best way to do everything. In aviation training, the Parks way is the best way. Parks Air College is the largest and finest flying school in America—because it has established a *matchless reputation* for *sincere, systematic, thorough, personal training* of every one of its students.

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*Here is a partial list of manufacturers using Stromberg Carburetors as standard equipment:*

# RECOGNITION

**135** manufacturers use Stromberg carburetors as standard equipment. This impressive list, shown here, contains representative firms in every line of industry where motors are used.

These firms **KNOW** that Stromberg superior performance is the result of the highest type of carburetion engineering, the finest workmanship, the best materials procurable.

They recognize real merit and are willing to pay for it.

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American Cirrus Eng. Co.  
Axelson Machine Co.  
Comet Engine Corp.  
Continental Motors Corp.  
Curtiss Aero & Motor Co.  
Fairchild Caminez Eng. Corp.  
Kinner Airplane & Motor Corp.  
Lambert Aircraft Co.  
(formerly Velie Motors Corp.)  
LeBlond Aircraft Engine Co.  
Lycoming Motor  
MacClatchie Manufacturing Co.  
Michigan Aero. Engine Corp.  
Navy Department  
Pratt & Whitney Aircraft  
O. E. Szekely Corp.  
War Dept.—Air Corps  
Warner Aircraft Corp.  
Wright Aero Corp.

## AUTOMOBILES

Chrysler Corp.  
Continental Motors Corp.  
Cunningham Son & Co.  
Dodge Bros. Corp.  
(Lincoln) Ford Motor Company  
H. H. Franklin Mfg. Co.  
Hupp Motor Car Corp.  
Jordan Motor Car Co.  
Locomotive Co. of America, Inc.  
Marmon Motor Car Co.  
Peerless Motor Car Co.  
Pierce-Arrow Company  
Sayers Scoville Co.  
The Studebaker Corp.  
Windsor Corporation

## MARINE

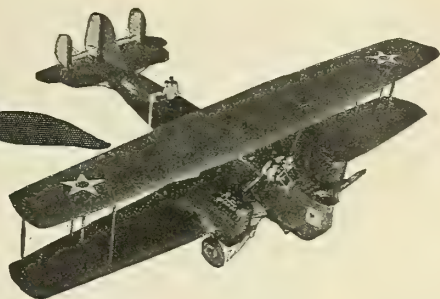
Consolidated Ship Bldg.  
Sterling Engine Co.

## TRUCKS, TRACTORS, ETC.

Acme Motor Truck Company  
The Autocar Company  
Brockway Truck Co.  
Climax Engineering Co.  
The Four Wheel Drive Auto Co.  
Graham Bros.  
Hercules Motor Corp.  
Indiana Truck Corp.  
International Motor Co.  
International Harvester Co.  
Le Roi Company  
Lima Locomotive Works  
Maccar Truck Co.  
Minneapolis Steel & Mach. Co.  
Minneapolis Threshing Machine Co.  
Sanford Motor Truck  
Schramm, Inc.  
Selden Truck Co.  
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# WANTED PILOTS



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**Mechanics  
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Ask yourself this question: What will the aviation industry amount to in a year or so? And you know the answer—it will be America's most gigantic industry.

And question number two: Isn't it logical to assume that the men who get into aviation now will grow with the industry and be among the leaders "tomorrow?" We all know that to be so.

Even today, though aviation is still in its infancy, there is a big demand for pilots, for men in aviation factories—air transport companies—passenger and express service—air mail—barnstorming—aerial photography, motion picture work, crop dusting, etc. Opportunity! Fellows, aviation teams with it. Reason it out for yourself; thousands of passengers and tons of mail and freight are now being swiftly and safely carried all over the country daily. Manufacturers are all behind in supplying the demand for airplanes. Why? Because there are not enough men ready to step in and function in the various branches of the industry.

### GREER TRAINING LEADS TO EXPERT WORK

In the great seven and four story Greer shops you learn on actual equipment. And what training! You learn metal construction—wing building—woodworking—engine repair—acetylene welding—carburetors—ignition—complete airplane construction—rebuilding—repairing—meteorology and navigation.

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# GROUND FLOOR WORK TO THE SKY'S LIMIT !





# Like great-tough- rolling rubber pillows. . . . .

*Airwheels contribute new safety to  
take-off or landing*

**A**IRWHEELS are the latest Goodyear accomplishment—a complete departure from the wheel, tire and shock-absorber of the past.

The plane almost floats along on Airwheels until it takes the air; there are no hopping bumps at starting.

Because they need only 5 to 20 pounds of pressure, they “mushroom” on soft, wet fields, sand or snow—and land the ship in safety where it never dared land before.

In any landing, Airwheels maintain continuous ground contact. They soften the violent rebound—and by rolling continuously against the ground, make brakes take hold more smoothly with shorter, safer stops.

Streamline in shape, they cause less wind resistance. In weight, they are the same or less than the equipment they replace.

Wheel failures are eliminated, because Airwheels need no other wheel. Tests

have shown that they can land deflated without serious loss of radial distance.

They make it almost impossible to drag a wing in a ground loop—even if you try to do it.

With Airwheels it is reasonable to believe that all types of ships will need no other shock-absorbers.

The demand for Airwheels is still ahead of their production, but information or engineering assistance will gladly be given if you wish to use them on future ships. Write Aeronautics Department, Goodyear, Akron, O., or Los Angeles, Calif.

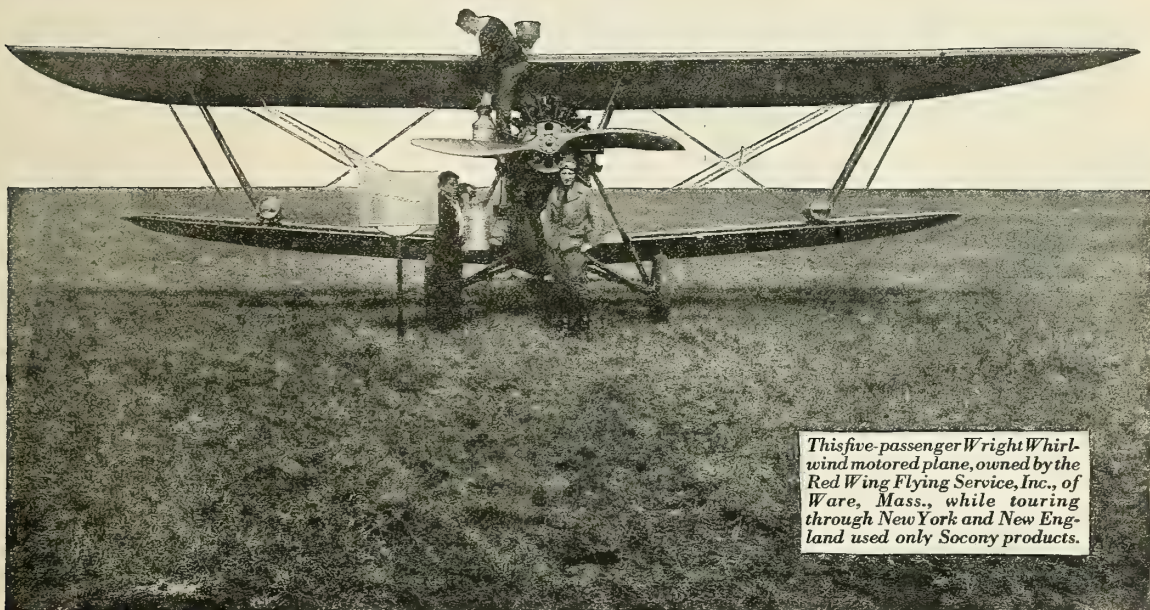
# GOODYEAR

*Everything in rubber for the airplane*

Copyright 1929, by The Goodyear Tire and Rubber Co., Inc.

# TRIED *the* OTHERS

## *Now uses Socony*



*This five-passenger Wright Whirlwind motored plane, owned by the Red Wing Flying Service, Inc., of Ware, Mass., while touring through New York and New England used only Socony products.*

“WE have tried numerous aviation gasolines and oils,” said Roy Ahearn, chief pilot of the Red Wing Flying Service, Inc., of Ware, Mass., “but we have always come back to Socony products. Our advance purchasing man has orders to buy only Socony in New York and New England.”

This is the opinion of a crack pilot who has had more than four thousand hours of flying to his credit, and is a member of the famous Caterpillar Club.

Before using Socony Aircraft Oil, Ahearn put it to a severe test. The plane was flown for twenty hours with an average of five minutes to the flight. This continual opening and closing of the motor is unusually severe on oil. At the completion of the long day's grind, a check showed that only two quarts of oil were used, and the remainder was in excellent condition.

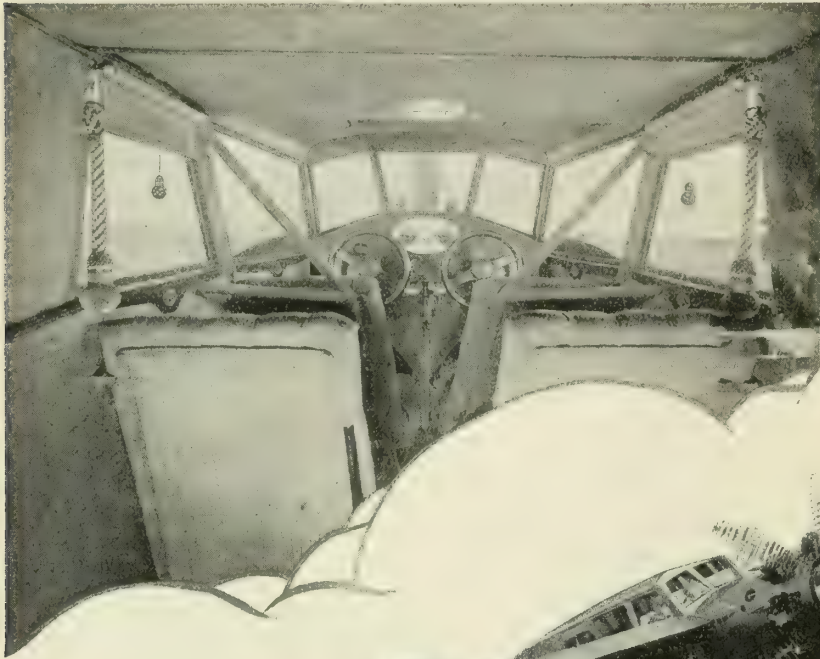
You too will find that Socony aviation products will withstand the severest tests a plane gives them.

## SOCONY

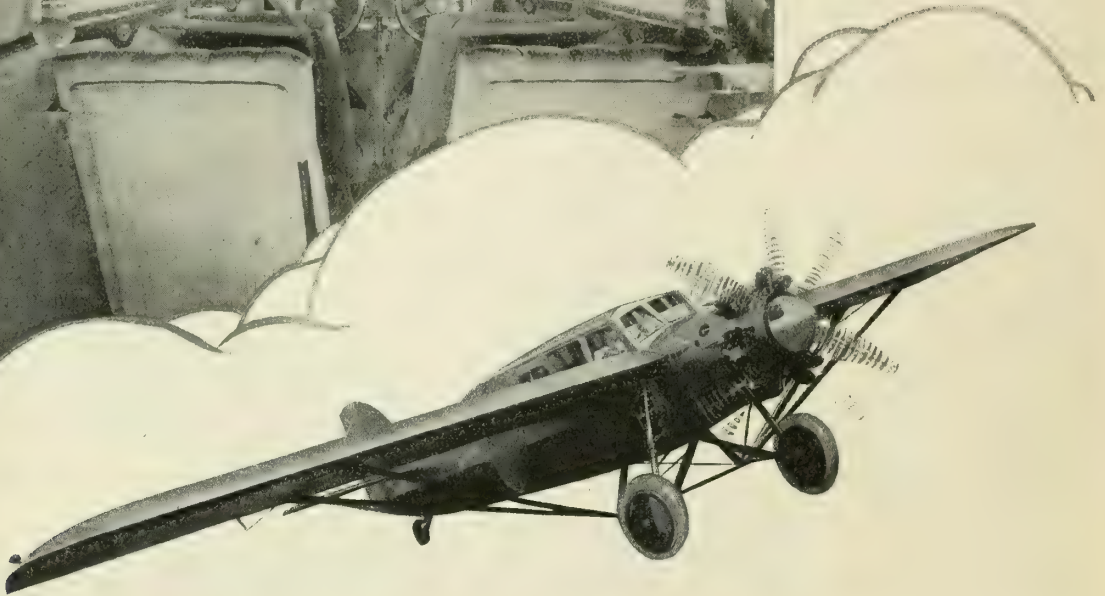
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# THE PERFECTED CENTER-WING



*More Speed  
per Horse Power  
Perfect  
Balance*



## WHAT Will Determine YOUR Choice?

Unlike automobiles, most good planes of equal capacities operate more or less alike; they look alike, they are alike, — except for paint, details or name plates.


Test one and you've tested a dozen makes. But test an "Invincible" and you've tested "a different plane." It *looks* different, it *is* different. And that difference is worth your time and consideration.

Only a flight test can reveal a plane's personality. The center-wing principle will change your expectations of what a modern plane should do. Arrange for that Invincible flight test before you buy.

Powered by a Curtiss Challenger 170 H.P. motor, the "Invincible" climbs the first thousand feet in fifty seconds, cruises 700 miles at 120 M.P.H. and has a top speed of 142 M.P.H. Four - place completely equipped, luxuriously appointed, \$7,800.00 at factory. Details also of the Two-Place Invincible Center-Wing Monoplanes upon request.

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## INVINCIBLE PLANES



# Stand aside! Stand aside! for the Over-Air Mail!

*Is the fog creeping down?*

*He must go without fail.*

*Is the storm shrieking wild?*

*He must face it, nor pale . . .*

*Oh Lords of the Frigid, and Gods of the Gale,*

*Stand aside! Stand aside! for the Over-Air Mail!*

With apologies to Kipling's  
poem "The Overland Mail"

**N**O headlines herald his safe arrival. No publicity lime-light spots him in a gleam of glory. No wild plaudits of a hero-mad

public beat upon his duty-bent body.

But, gentlemen, for day-in and day-out nerve, stamina, and skill—*hats off to the air mail pilot!*

It is a point of fair pride with Spalding that so very many air-mail pilots find in Spalding Flying Clothes the proper partners for their routine wrestlings with the elements.

Such approval among veterans seems a natural thing to us—for here are suits designed by no novice—but by men whose thousands of hours in the air have given them a cold, practical knowledge of what is needed in the way of protection and freedom of movement.

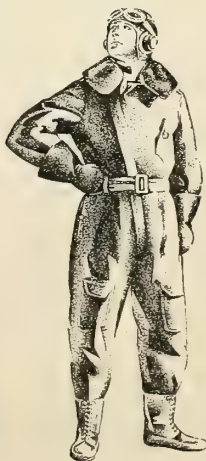
So the Air-Mail Suit has an outer shell of all-leather, and is lined with wool fleece—with a lamb fur collar in which to cuddle the chin and neck against the biting breeze. This suit is a sure shield against sub-zero winds, against pelting snows or whipping rains. Under its invulnerable protection, you remain dry, and cozy, and warm.

Yet it is not bulky. It does not hamper your movements, and 5 Talon fasteners permit putting it on, or off, in a very little time. Convenient pockets for maps, waste, and things.

This Ace of Aces among flying suits costs \$110. Try to wear out that \$110 worth—you'll wear out several ships before you scrap the suit.

Spalding has, of course, a complete line of flying equipment. You can see it at Spalding stores and at many of the leading fields. Or write in for a catalog.

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*A. G. Spalding & Bros.*

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Please send free Aviation Catalog.

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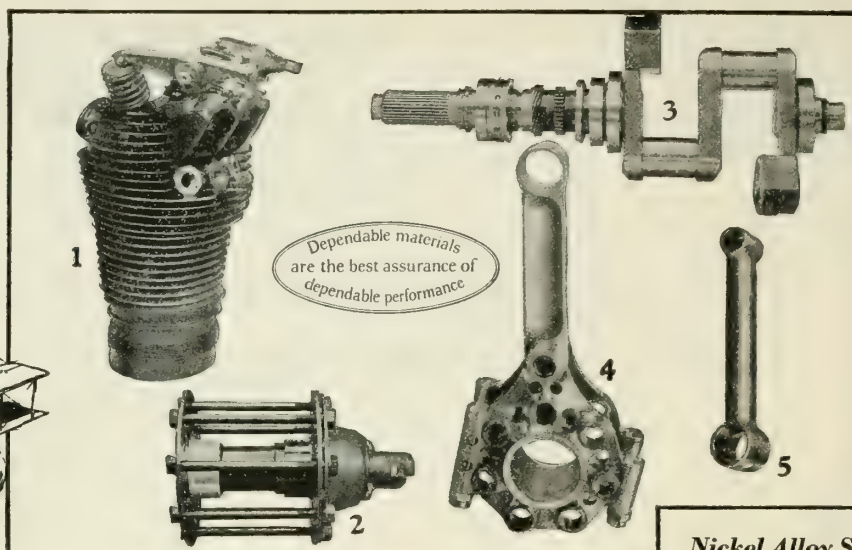
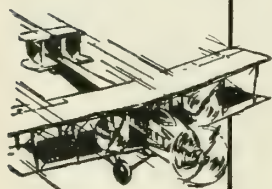
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Nickel Alloy Steel (1) cylinder (2) propeller hub (3) crankshaft (4) master rod and (5) connecting rod of Jaguar aero engine. Manufactured by ARMSTRONG SIDDELEY MOTORS, LTD., Coventry, England. This famous engine contains approximately 20 lbs. of Nickel.



## In English Channel Service

... Armstrong Siddeley  
Jaguar Aero Engines demonstrate dependability  
of Nickel Alloy Steels

### Nickel Alloy Steel parts in Jaguar Aero Engine

Cylinders  
Crankshafts  
Master rods  
Link rods  
Propeller shafts  
Propeller hubs  
Valve mechanism  
Gudgeon pins  
Art. rod pins  
Tappet rollers  
Reduction gears  
Cam gears

FOR several years radial air-cooled Jaguar engines have been flying daily across the English Channel on the London-Paris airline. Today, the total flying time of the three triple-engined Argosy planes used is approaching 7,000 hours and the total distance covered is nearly 630,000 miles. In this severe service Jaguar engines have been run a period of 400 hours between overhauls and have established unusual records for reliability and economy.

The Jaguar is also the standard engine employed in the various planes of the Royal Air Force. An Armstrong Siddeley engine flew from London to Cape Town and back... and from England to Australia and return—a distance of 44,000 miles. Upon inspection the engine revealed practically no trace of excessive wear.

Nickel Alloy Steel is used for all highly stressed parts of the Jaguar engine. More than 20 lbs. of Nickel are used in making alloy steel for various parts. Under the most exacting flying conditions and in extremes of temperatures, Nickel Alloy Steel parts have demonstrated their unquestioned dependability.



Extensive tests have demonstrated that the average, maximum and minimum values of Nickel Alloy Steels vary less from heat to heat than those of other alloy steels—that their mechanical properties are dependably uniform. This is but one of the reasons why practically all manu-

facturers of airplane engines, both in America and Europe, have adopted Nickel Alloy Steel for highly stressed parts which must have utmost dependability without excessive weight.

# Nickel

FOR ALLOY STEEL

SEND FOR "BUYERS' GUIDE TO NICKEL ALLOY STEEL PRODUCTS"

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Congratulations to John Livingston and Arthur Davis, who piloted Waco Straight Wing J-6 300's equipped with specially constructed Consolidated instrument boards in placing first and second, respectively, in the Annual National Air Tour held in October for the Edsel Ford Reliability Trophy.

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# *and this* STEARMAN



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Approved Type Certificate No. 251

## *is the new* C3R

An outgrowth of the popular C3B. • Powered with a Wright J-6, 225 H. P., Whirlwind 7 • Top speed, 129 M. P. H. • Cruising speed, 105 M. P. H. at 1700 R. P. M. • Pay load, 400 pounds. Cruising range, 5½ hours. (These are conservative performance figures based on average conditions at varying altitudes.)

... a wonderful ship, staunch and mobile ... The last final test of the C3R is now history. Stearman engineers—pardon their elation—proudly watch these new ones take off, east and west, for owners 1930. ... There's a new feel to the stick—a new touch to the throttle. Pilots will exclaim—"It's another Stearman ... and even better." ... Soon you'll be seeing this new C3R at your own port. If you wish to inquire—there's the seasoned pilot, our good friend, who knows all about Stearman. Then the sportsman pilot who flies one—ask him. Or phone, wire, or write the factory ... THE STEARMAN AIRCRAFT COMPANY, WICHITA, KANSAS, Division of United Aircraft and Transport Corp.





I FOUND THAT OUT  
THE FIRST HOP  
I MADE WITH  
**QUAKER STATE !**

THAT **EXTRA** QUART  
IN EVERY GALLON  
MEANS A LOT !



**G**IVE her Quaker State Aero Oil, then give her the gun—and you, too, will find that the *extra* quart in every gallon means a lot!

And what do we mean by an *extra* quart in every gallon of Quaker State? Just this . . .

Ordinary refining leaves in every gallon of oil, a quart or more of material that has little or no value in lubricating an airplane motor—a quart of waste.

But Quaker State Aero Oil is not refined in the ordinary way. It is *super-refined*—carried a step further. And this “extra step” removes the quart of waste that ordinary refining leaves in. In its place you get a quart of *lubricant*—you get an *extra* quart in every gallon of Quaker State!

And all four quarts are made from the very finest crude oil that the world produces . . . 100% pure Pennsylvania Grade Crude . . . the value of which is two or three times that of the crudes from which ordinary oils are made!

Let Quaker State itself prove the difference! Ask for it at your airport, let your motor have it . . . then sit back and enjoy the smoothest, sweetest lubrication you ever found for an airplane motor! Quaker State is sold everywhere—there are over 600 Quaker State distributing warehouses and more than 80,000 Quaker State dealers in the United States and Canada to serve you!

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. . . . . Other Pure Pennsylvania Products Are: . . . . .

QUAKER STATE MEDIUM MOTOR OIL . . . QUAKER STATE COLD TEST  
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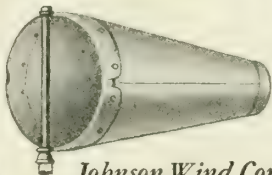
# Contact for All the Best Aeronautical Supplies

Complete Stocks - Prompt Service



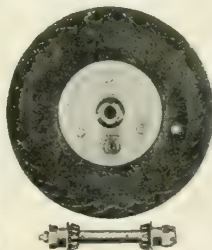
## Air Speed Indicator

A complete unit that can be attached to any plane easily and quickly. It tells the story accurately and plainly. Only ten dollars.



## Johnson Wind Cones

Three styles and prices to meet the exact needs of every port. All are quality wind indicators. They satisfy—and last!



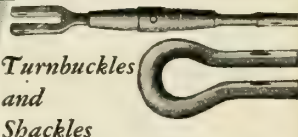
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The most popular and practical tail wheel on the market. Built to stand the gaff but simple in design and easy to assemble.

Think of Johnson first as a dependable source of supply for everything aeronautical. Dependable in quality, price and service. Everything according to Army and Navy standards. The items shown at left we manufacture ourselves (along with a number of other extra good products); while those shown at right are only a few of the hundreds we regularly carry in stock. "The best in everything for pilots, planes and ports"—that's our motto. Write today for your copy of our big free catalog—and see for yourself what Johnson Service means! Please state whether you are manufacturer, operator or pilot.

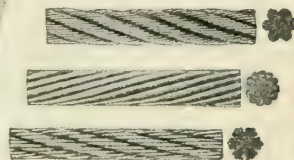
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Pipe Fittings  
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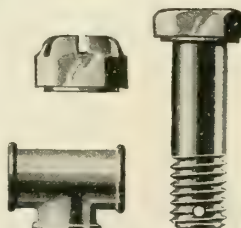
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Aircraft Standard—for controls, brace wires, etc. All standard sizes and strengths carried in stock, ready for immediate shipment.



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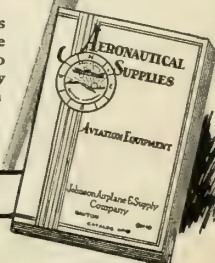
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WICHITA, KANSAS

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LOS ANGELES, CAL.





The Irvin Air Chute is contained in a compact package strapped to your body. When released, the parachute springs out of its pack, fills with air and lowers you gently to earth.

# EASY to OPERATE

**ONE PULL ON THE RING AND THE PARACHUTE OPENS**

Simplicity is the outstanding characteristic of the Irvin Air Chute, both in its construction and its operation.

To open the chute jerk the pull ring. One simple operation . . . no involved directions . . . just pull! Instinct alone will cause you to clutch at this readily accessible ring, and that ring is your passport to a gentle landing!

And an Irvin is almost as easy to replace in its pack. It is simple to fold and fits snugly in place all ready for the next time it is needed.

The Irvin Air Chute is available in seat, lap or back pack types. All Irvins are identical in construction and are made

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Irvin Air Chutes are available in all sections of the country. Among the important distributors are Curtiss Flying Service, Inc., The National Flying Schools, Air Associates, Inc., and Nicholas-Beazley Airplane Co. Dealers who are interested should communicate directly with the company. If there are no dealers near you, write to us and we will arrange the most convenient way to supply your needs.

**IRVING AIR CHUTE CO., Inc.**  
372 Pearl Street, Buffalo, N. Y.

# IRVIN *The Life Preserver* of the Air

Our Motion Picture "Happy Landings" on standard width film, illustrating actual operation of the Irvin Air Chute is available free of charge to schools, clubs and organizations interested in aviation. Send for booklet and particulars.





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## THE WORLD'S FASTEST COMMERCIAL AIRPLANE!

It is a significant fact that the majority of Lockheed airplanes in service are used for transport purposes. Commercial airline owners know that Lockheeds operate at the lowest cost per passenger mile—and provide the greatest service to passengers in time saved.

*The Lockheed-Vega will be on display at the Western Aircraft Show, Los Angeles, Nov. 9th to 16th.*




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LOCKHEED AIRCRAFT CORPORATION . . . . Los Angeles, California  
Division of  
 DETROIT AIRCRAFT CORPORATION . . . . Union Trust Building, Detroit

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THE  
BERRYLOID  
FLEET

NUMBER EIGHT



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*and*  
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AIRCRAFT FINISHES

COMMAND-AIRE planes roll out of the finishing room like clock-work, beautified and protected with Berryloid Aircraft Finishes. Niobe Brown and International Orange, standard Berryloid colors, combine in a scheme suggested by the Scarlet Rump Tanager, on the ship illustrated above.



*Each*  
**COMMAND-AIRE**  
 a tribute  
*to*  
**Berryloid**

COMMAND-AIRE  
 was preceded  
 in this series  
 by  
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## COMMAND-AIRE

INCORPORATED  
 MANUFACTURERS OF AIRPLANES  
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July 2, 1929

Mr. Thos. B. Colby, Mgr.,  
 Aviation Department,  
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 Detroit, Michigan.

Dear Mr. Colby:

In view of the numerous letters which we have written you  
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 this communication seems superfluous.

Now, however, at the height of our rush season, the pecu-  
 liar dependability of your products is forcibly impressed  
 upon us.

We are far behind with deliveries and any delay in our pro-  
 duction schedule would be disastrous. It is most essential  
 that each department in our factory carry its share of the  
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Thanks to Berryloid and its kindred products - Lionoil and  
 Semi-Pigmented Dope, we can rest secure in the knowledge  
 that our COMMAND-AIRES will roll out of the finishing de-  
 partment on time, each a thing of beauty, and each a tribute  
 to the dependability of Berryloid products.

Kindest personal regards.

Very truly yours,

COMMAND-AIRE INC.,

By: *W. F. Scott, Jr.*  
 W. F. Scott, Jr.,

WFS:H

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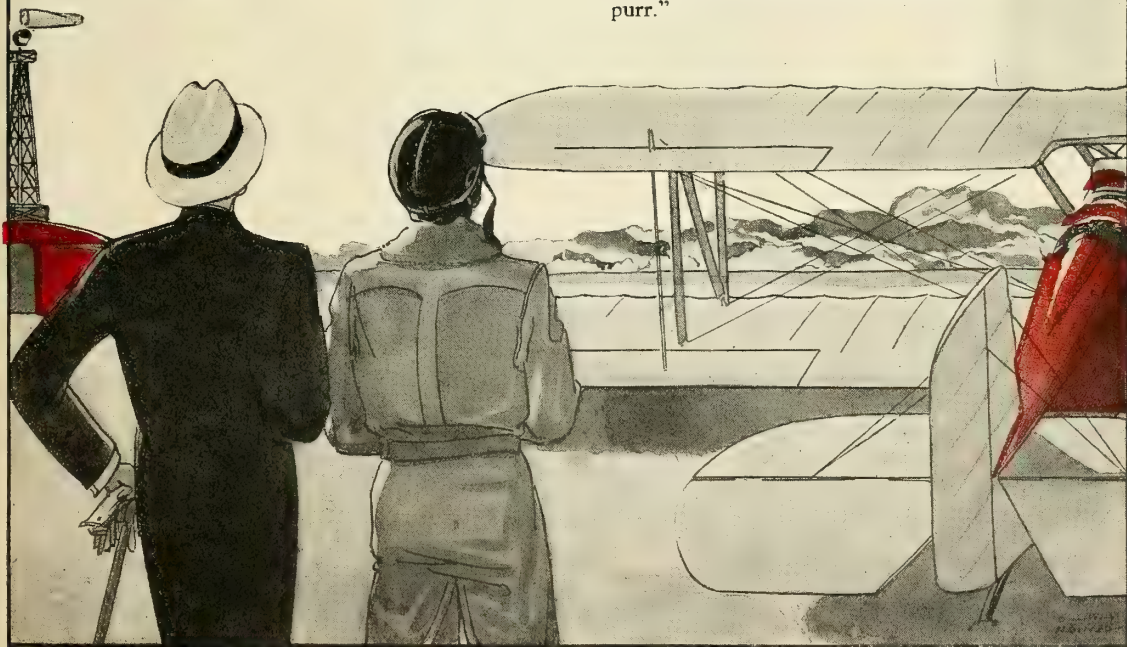


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\* "What a pretty hum that Sport Plane has."

"Yes, you can tell it's an Axelson Engine. She certainly has a sweet purr."



\*The improved Axelson Motor is now on production.

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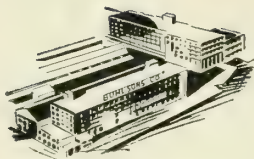
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**J**UST as tried troopers are sprinkled among the ranks of a new regiment to season the recruits, so must a new industry seek a stabilizing influence from enterprises whose colors have flown gallantly over many an industrial battle-field. That is one reason so many manufacturers in the aircraft industry turn to the Buhl Stamping Company for metal stampings of all kinds and descriptions. The enviable Buhl record of more than 40 years of leadership in its particular field is sufficient guarantee that here is an intelligent, efficient, economical source of supply operating upon the sound fundamentals of basic knowledge and wide experience.



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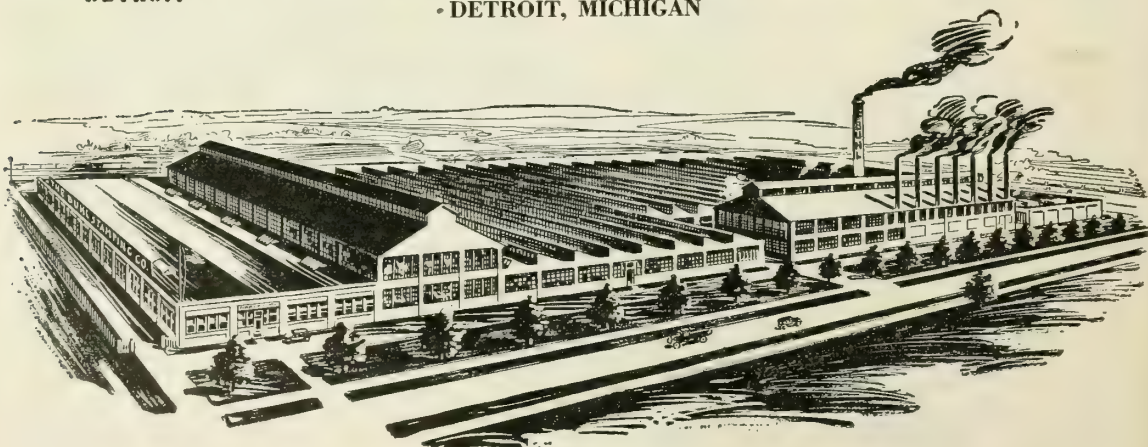
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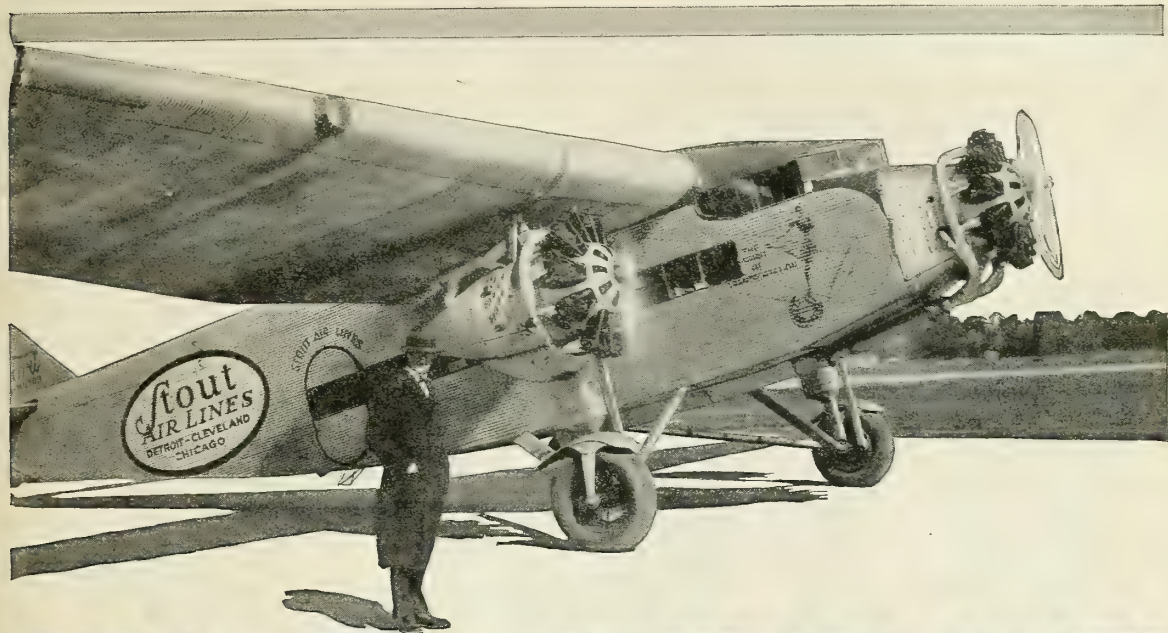
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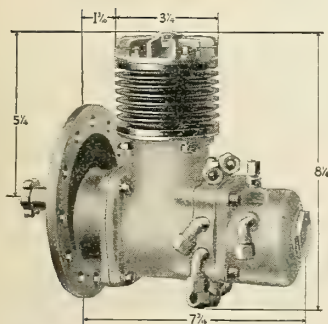
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# HEYWOOD STARTER



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**HEYWOOD**

Wm. B. Stout, the aeronautical engineer of international reputation, has equipped his personal ship with a Heywood Starter.

Also the Stout Air Lines are using this advanced product. It stands to reason that such authorities select their equipment with exact knowledge. They know the facts.

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Simple in operation—adaptable to all standard engines—dependable—always start instantaneously—light in weight.

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AC instruments for aviation, with plain or luminous dials, are designed and built to render infallible service. They are made by precision methods, are thoroughly tested for accuracy, are proved to be extremely durable.

The AC Tachometer is of the magnetic type, compensated against errors caused by temperature changes. It has but two moving parts—one is a speed indicat-

*AC Tachometer, range 0 to 2500, 0 to 4000, 0 to 6000 and 0 to 8000. Luminous dial in 0 to 2500 type available at slight additional cost.*



ing element, the other is an armature driven by the drive shaft. AC Flexible Shaft should be ordered separately, according to length desired.

The face of the AC Tachometer is 3 1/16 in. in diameter. The bezel is of brass, chrome plated. Dial indications of 0 to 2500, 0 to 4000, 0 to 6000 and 0 to 8000 are available—clockwise and counter-clockwise.



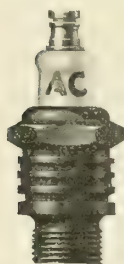
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*AC Thermo Gauge. Range 32 to 212°F., shipped complete with 12-foot capillary tubing. May be had with luminous dial at slight additional cost.*

*AC Oil Pressure Gauge available in three ranges 0 to 50, 0 to 100 and 0 to 120. Luminous dial available in 0 to 50 lb. type at slight additional cost.*

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## AC SPARK PLUGS



*AC Type N  
Regular Metric Aircraft*

AC-SPHINX  
Birmingham  
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AC has developed three successful types of metric spark plugs which are specially designed and built for aircraft engines.

AC Type "N," known as Metric Semi-Aircraft (Regular), is recommended for air cooled engines operating at cruising speeds, or where continuous fouling is experienced with type "NN-1" or pre-ignition with type "N-1."



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AC Type "N-1," known as our Metric Semi-Aircraft (Modified Aircraft), is recommended for water-cooled engines, or in air cooled engines where fouling is experienced with type "N."

AC Type "NN-1," known as our Short Metric Aircraft, is recommended for air cooled engines operating at full throttle over long distances, or where pre-ignition is experienced with type "N."



*AC Type NN-1  
Short Metric Aircraft*

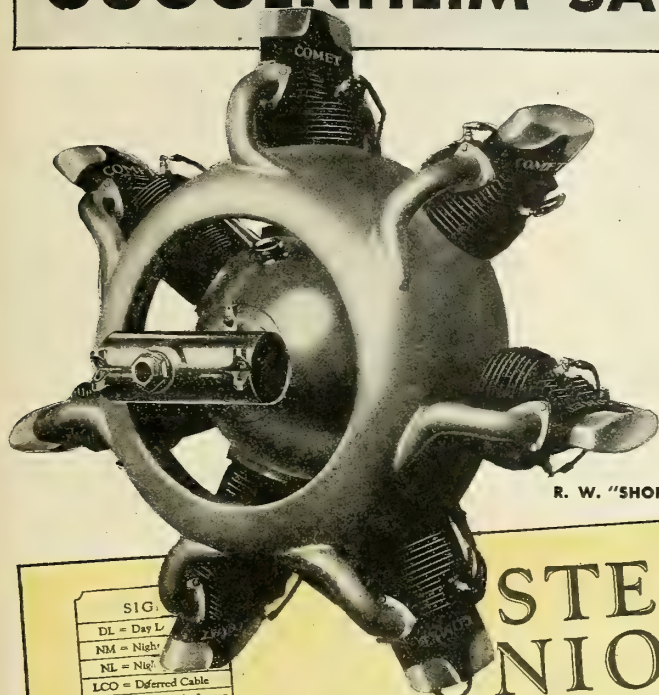
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# SCHROEDER SELECTS COMET for GUGGENHEIM SAFETY CONTEST



R. W. "SHORTY" SCHROEDER



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NM = Night Message
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COMPETITION STOP SELECTION WAS BASED ON ITS CLEAN AERODYNAMIC

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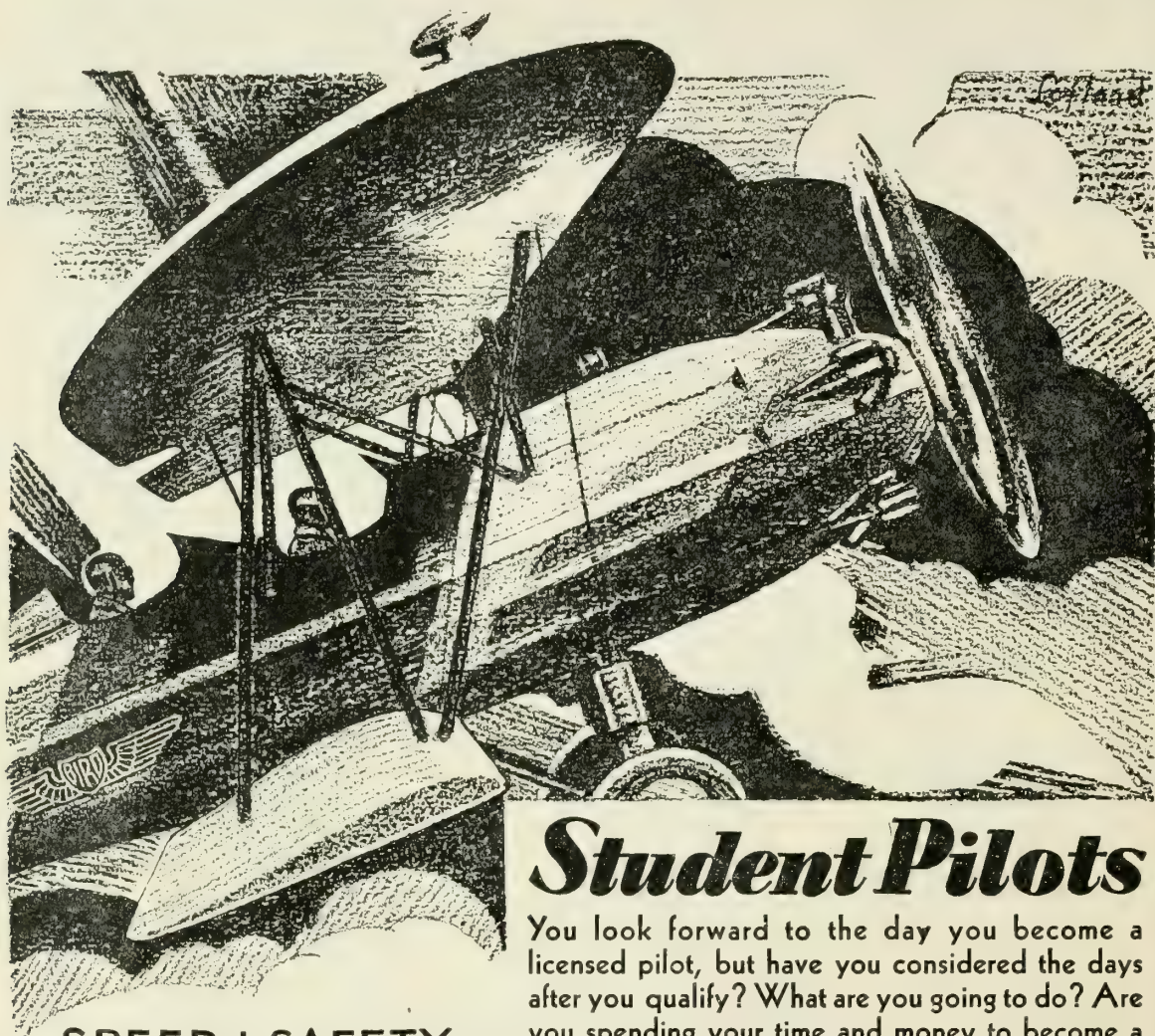
Comet aircraft engines are manufactured at Madison, Wisconsin, under the direction of the Gisholt Machine Company, for 40 years builders of fine machine tools in use throughout the world.

7 cylinders, 150 horsepower (manufacturer's guaranteed rating).

## COMET ENGINE CORPORATION

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Ever since the first Brunner-Winkle BIRD took the air it has held the standard for performance with safety.

Its internal construction, its wing design, its inherent stability—every item of its design and assembly have lifted this plane to its superior position in the popular priced class.

And now the NEW BIRD powered by Kinner 90 H.P. (Approval Certificate No. 239) will win even higher praise for its ECONOMY with SAFETY and PERFORMANCE!

## Student Pilots

You look forward to the day you become a licensed pilot, but have you considered the days after you qualify? What are you going to do? Are you spending your time and money to become a sports pilot or are you building for the future?

If you want to know how you can make your flight training pay for itself—if you want to learn how others are making good incomes, become acquainted with the BIRD PLAN.

Write today and tell us about yourself—the number of hours of instruction, when you expect to qualify—and we'll show you how others are making money on this plan.

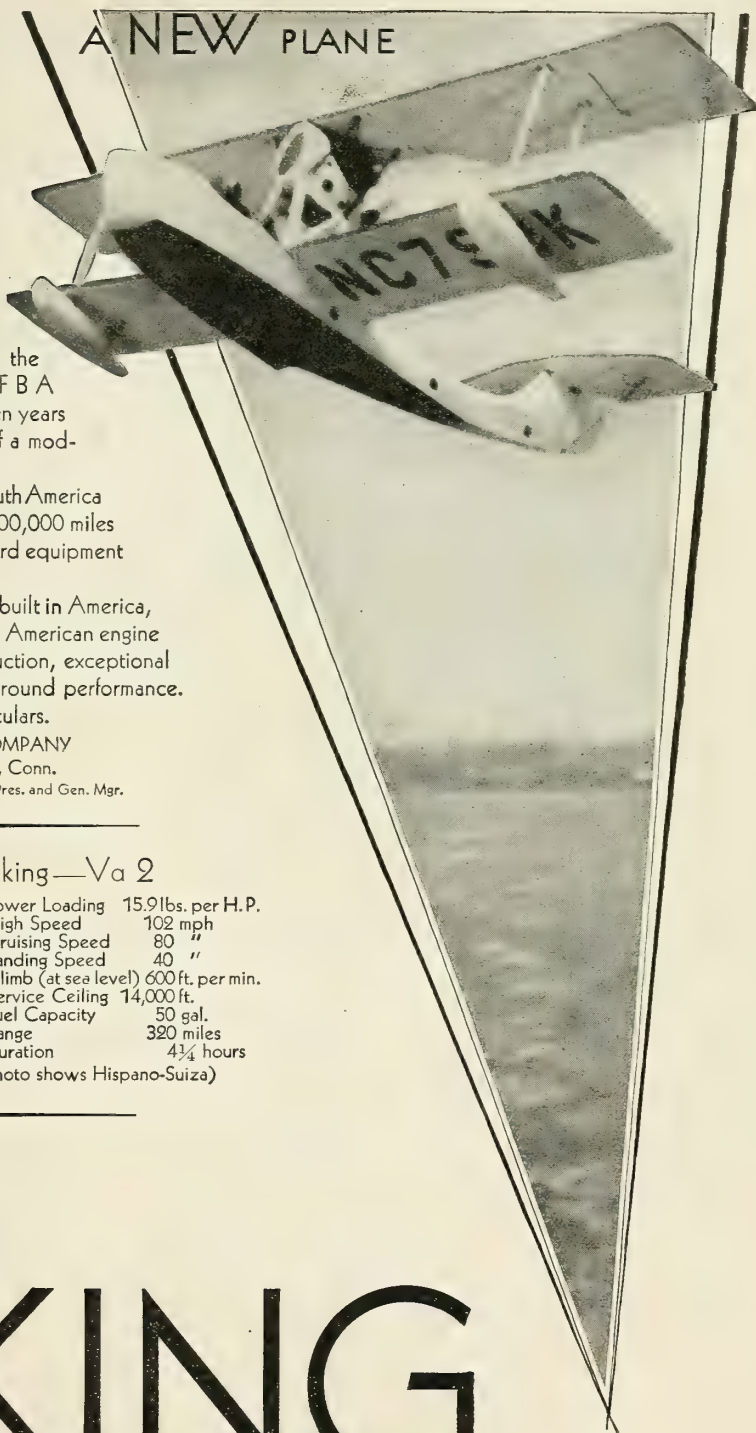
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17 Haverkamp St., Brooklyn, N. Y.



*Safety Performance*

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The Viking Amphibian and Flying Boat is the American interpretation of the European F B A . . . built by Mr. Louis Schreck who for fifteen years has concentrated upon the development of a moderate size flying boat.

The Schreck is known in Europe, Asia, South America and Canada . . . behind it is a record of 6,000,000 miles without a structural accident . . . it is standard equipment in the French Navy.

Founded upon Schreck experience . . . built in America, by American workmen . . . powered with an American engine . . . the Viking is a plane of sturdy construction, exceptional stability, safe flying qualities, and fine all-around performance.

We shall be glad to send you full particulars.

THE VIKING FLYING BOAT COMPANY

89 Shelton Avenue, New Haven, Conn.

R. E. GROSS, President R. D. THOMAS, Vice-Pres. and Gen. Mgr.

### Specifications of the Viking—Va 2

Span	42' 3"	Power Loading	15.9 lbs. per H.P.
Length	29' 4"	High Speed	102 mph
Height (on wheels)	11' 3"	Cruising Speed	80 "
Wing Area	448 sq. ft.	Landing Speed	40 "
Weight Empty	2480 lbs.	Climb (at sea level)	600 ft. per min.
Useful Load	1020 "	Service Ceiling	14,000 ft.
Pay Load	850 "	Fuel Capacity	50 gal.
Loaded Weight	3500 "	Range	320 miles
Wing Loading 7.94 lbs. per sq. in.		Duration	4¼ hours

Engine—Wright J-6, R760—225 H.P. (Photo shows Hispano-Suiza)

# THE VIKING FLYING BOAT



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fields in the territory  
in which we operate  
you will find these-

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AMOCO-GAS

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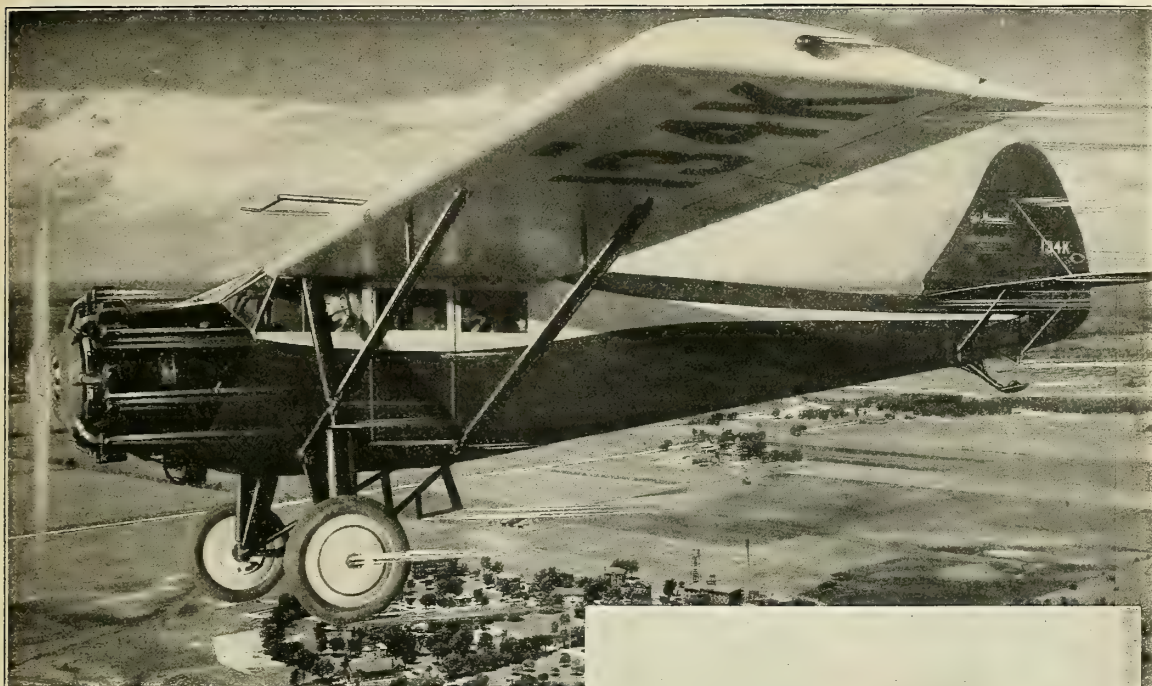


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## The Monocoach

## WELCOMES COMPARISON

In performance—comfort—dependability—luxury and *VALUE*, the new Monocoach welcomes comparison with all other quality production aircraft. Nothing else will prove so conclusively—so decisively—the supremacy of this four passenger cabin plane.

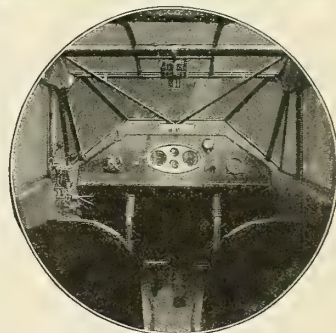
Altho designed and engineered especially to meet the growing demand of the private flyer for a family and guest plane, the Monocoach has proven itself invaluable for business and passenger service. Powered by the Wright W.W. J-6, it has an excess of reserve power and a speed of 133 miles per hour.

Is offered at about two-thirds the cost of the slightly larger cabin planes and approximately the same price as the conventional open three place biplanes, equipped with engines of less horsepower.

Price: \$8,250 flyaway Moline, Ill.

### Specifications and Performance Data

High wing monoplane	
4 place enclosed cabin	
Color.....optional	
Upholstery.....mohair	
Span.....	39 feet
Length.....	26 feet, 8 in.
Height.....	7 feet, 8 in.
Wing Area.....	222 sq. ft.
Weight—Empty.....	1919 pounds
Weight—Full Load.....	3092 pounds
Fuel Capacity.....	63 gallons
Engine.....	Wright W.W. J-6
Horsepower.....	225 h.p.
Landing Speed.....	48 M.P.H.
High Speed.....	132 M.P.H.
Cruising Speed.....	117 M.P.H.
Cruising Range.....	650 Miles
Ceiling.....	22,000 feet
Climb, per minute.....	1,200 feet



Dual Control; Hamilton or Standard Steel Propeller; Eclipse Starter; Bendix wheels and brakes; Split type landing gear; Oilraulic shock struts; Navigation lights; Pioneer Compass and Air Speed Indicator; Thermo-Pete oil pre-heater; Consolidated Instrument Board.

Department of Commerce Certificate of Approval  
Number 201

# MONO AIRCRAFT CORP. MOLINE ILLINOIS

Builders of the *Monocoupe*, *Monosport*, *Monoprep*, and *Monocoach*



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*For the second  
successive year...* **WACO**



*The two WACO entries, piloted by John Livingston and Arthur J. Davis, ran neck-and-neck throughout the tour, finishing with scores far ahead of the other 27 contestants. Last year, also, WACO led the field.*



"ASK ANY PILOT"

MODERATE PRICES AND CONVENIENT TERMS MAKE IT EASY TO OWN A WACO. COMPLETE DETAILS AT YOUR REQUEST.

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# WINS THE NATIONAL AIR TOUR

Repeating its spectacular performance of last year, and scoring a still more impressive victory, WACO again won by a comfortable margin.

The rules of the competition for the Edsel Ford trophy are such that, by deliberate intent, the *practical* performance of an airplane is given definite valuation. The record of the two WACOs is, therefore, conclusive proof of WACO's outstanding merit . . . of WACO's rating as *the* practical airplane to own and to fly.

The Fifth National Air Tour again confirms the superior performance which has made WACO the most popular commercial aircraft in America.

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AND, IF YOU WISH, ANY ONE OF THE NEARLY 300 WACO DEALERS WILL ARRANGE A FLIGHT DEMONSTRATION FOR YOU







# Those towering webs of STEEL

Twenty—thirty—forty stories in the air, metal ribbed skeletons throw their shadows against the sky. Brawny arms of giant cranes lift massive members into place. The chatter of active hammers tells you that far up in the framework men are locking the girders with rivets of white hot steel.

Wherever you see steel structures going up, you will find W&B drills and reamers proving the rugged dependability that has made them famous.

For after 78 years devoted to the service of industry W&B continues to set the pace in the design and manufacture of cutting tools.

**WHITMAN & BARNES**  
DETROIT, MICH.

Canadian factory: Canadian-Detroit Twist Drill Company, Ltd., Walkerville, Ont.  
TOOL MAKERS FOR 78 YEARS



# WHICH PLANE?



They were made by the same factory. Their power rating is equal. Both pilots are veterans. In dependability there is no choice. They are *almost* identical.

Both have the same destination. Both fly the same air track. Their schedules are duplicate. They are competitors. Which plane?

To the prospective passenger who judges transport planes mainly by appearance (and there are thousands) the decision is instant. For the man or woman who is a prospective air passenger is the type who is accustomed to cleanliness. Cleanliness in person, in the office, in the home. He, and particularly she, expects cleanliness also in an airplane.

Great transportation systems, on land and sea, spend millions annually to *keep the equipment clean*. Yet airline operator, airport manager or private owner need not

incur heavy expense to keep flying equipment clean—and attractive to prospective passengers. For the Tridex Cleaning Unit is neither prohibitive in initial or operating cost and with one man to operate cleans planes thoroughly from nose to tail in from fifty minutes to two hours, depending upon the size of the plane.

The Tridex Model G was designed especially with scientific airplane cleaning in view. The machine first chemically softens the water, then produces a fine spray of warm, soapy water. The warmth opens the pores in dirt and grease, the soap enters and dissolves the mass, and the spray washes it away. Hardened accumulations of grease and dirt in inaccessible pockets of motor and cowlings melt and disappear as if by magic, leaving all surfaces really clean. The Tridex spray is also ideal for cleaning parts on which work is to be done, and for removing grease and oil from walls and floors.



The TRIDEX spray contains no chemicals, nor does it depend on force for its efficiency.

# TRIDEX

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GENTLEMEN: Please mail me without obligation, full information and prices on your Tridex Cleaning Unit.

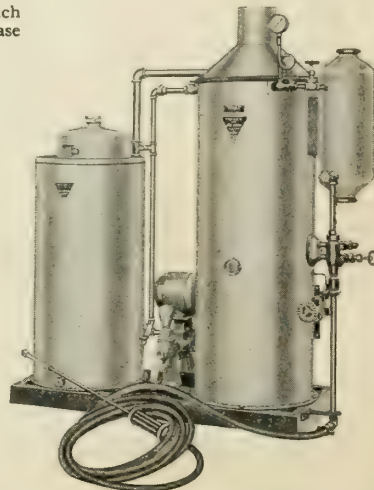
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No. 131MET—Imitation Bedford Cord. Chamols leather re-inforced. Button bottoms on legs. Pair **\$7.60**

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JX278—Full short mitten, genuine black horsehide, lamb lined. Pair **\$4.00**

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PHILLIPS PETROLEUM CO.

BARTLESVILLE, OKLA. MINNEAPOLIS, MINN.

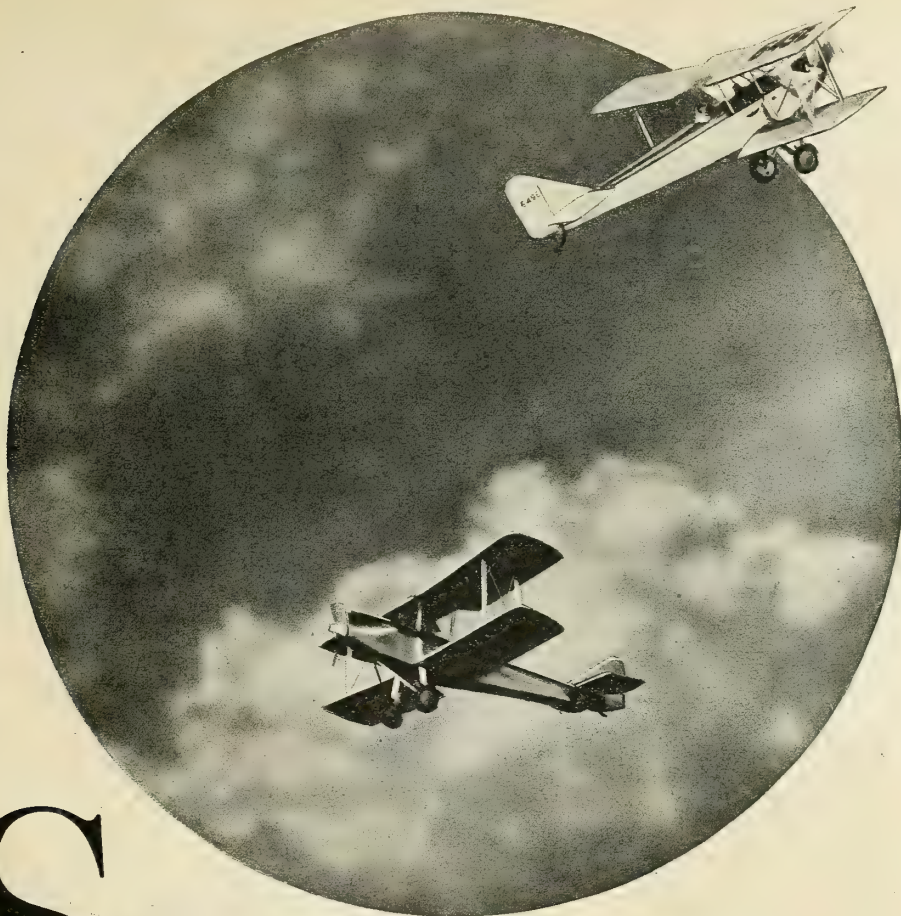
# Phillips'

## AVIATION

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Phillips  
Petroleum  
Company

N A T U R A L   G A S O L I N E   F O R   C O N T R O L L E D   V O L A T I L I T Y

Say you saw it in AERO DIGEST



# "Supremely safe"



—pilots in 16 different countries say this of the Avian

**B***BUILT* 8 times strong enough to resist the strain of normal flying . . . *equipped* with the most recent of safety developments . . . *tested* for its power and dependability on many a world's record flight!

But convince yourself of the Avian's outstanding air-worthiness. Hop into its comfortable cockpit and give it the gun. You'll take-off in a few yards and zoom right up into the blue. Then point toward the distant horizon and wing for it! . . . that tireless, air-cooled Cirrus motor purring out the miles by minutes tells its own story of reliability.

Now bank . . . now barrel-roll . . . now climb into a loop, then stall . . . Have no fear of the dread spin, for those Handley-Page wing slots stabilize the plane in half a turn.

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## WHITTELSEY AVIAN

THE OUTSTANDING SPORT AND TRAINING PLANE OF THE WORLD



## THE FORD TRI-MOTOR TRANSPORT IS EASY TO CONTROL



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THE FORD TRI-MOTOR is not at all designed for a stunt ship, but to carry passengers and freight safely for a profit. However, as evidence of its unusual maneuverability, combined with the tremendous reserve power of three engines and its great margin of safety, one of these giant planes was looped at the Cleveland Air Meet! . . . And, as a climax to this unforgettable demonstration of the Ford's perfect control in the air, the pilot flew the plane clear across the field upside down!

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The extraordinary maneuverability of the

Ford planes, combined with almost perfect stability in flight, and great structural strength, make them the pilot's first choice. Just as the safety, ample power reserve, all-metal construction, and economy of operation recommend them equally as well to the operating company. The Stout Metal Airplane Company, Division of Ford Motor Company, Dearborn, Michigan.

### FORD TRI-MOTOR 5-AT

*Span, 77 ft. 10 ins. Maximum speed, 135 M. P. H. Ceiling, 18,000 to 20,000 ft. Weight empty, 7500 lbs. Disposable load, 6000 lbs. Power load, 3 engines, 10.26 lbs. per H. P.; 2 engines, 15.42. Cabin accommodates 13 passengers, pilot and mechanics. Construction, all-metal throughout, exposed surfaces Alclad alloy. Power: 3 Pratt & Whitney Wasps, totaling 1275 H. P. Price, complete with standard equipment including instruments, seats, toilet, etc., fly-away Dearborn, \$55,000.*

Volume 15  
No. 5

# AERO DIGEST

NOVEMBER  
1929

THE MAGAZINE OF THE AIR

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*The high performance of Bellanca monoplanes has many times won Efficiency Trophies of major importance. This air view shows the latest Bellanca in flight.*

# EFFICIENCY, the Keynote to PROGRESS

NO doubt the speed and cross-country racing of yesterday has been the more dramatic, and naturally

By Leon Kelley

In short, aircraft builders themselves are beginning to recognize that speed alone will not compose the backbone of

their future, that other factors also influence the usefulness of aircraft.

has attracted the lion's share of public interest. But something besides spectacular flying will be expected from the air races of tomorrow. With greater experience in the air, the public, in its demand for safety, will show a quicker appreciation of stock model airplane efficiency and will ask the builder to demonstrate in competition.

Speed is easy to understand, so far as the non-flying public of today is concerned. A speed record is broken, or it stands—and your audience goes home only slightly less thrilled in the latter case. It's all over in a hurry, and it's very exciting! Cross-country races are exciting in a different way. They are extensive, and people all along the line can keep track of ships' numbers, check against newspaper accounts, and feel themselves somehow connected with the derby, no matter at what control station they may have witnessed the passing parade.

To appreciate an efficiency contest, however, the average spectator needs a good deal more information about what is taking place than he ordinarily is able to get. The conditions of the contest may be printed in his program (if he reads it), or the data may come to him over the microphone (usually in small doses), but he seldom acquires much information as to the characteristics and capacities of the individual contesting planes. Yet, it requires considerable understanding of all these matters fully to appreciate an efficiency contest. Unfortunately, no method has as yet been devised to educate the public in the finer points of aeronautics any faster than the public is able to educate itself. Efficiency contests still remain, therefore, of greater interest to those inside than to those outside the industry—a condition which will probably exist until a larger flying public somehow learns that speed is useful only insofar as it is intrinsically related to safety and efficiency. And that "efficiency" is the measure, to borrow Bill Stout's famous dictum, of the ability of the airplane to sustain itself financially as well as in the air. Nevertheless, from an engineering standpoint, which in the end means the standpoint of public service, the efficiency contests of these past few years have been rather significant and, if properly supported, are likely to become more so.

Strangely enough, this does not appear to have been the general conception of efficiency contests until lately. They sometimes have been erroneously discounted, or altogether ignored. After all, air races are in one sense airplane tests conducted in public. Much discussion has been published concerning the purpose of air racing, and we have been diverted one way or another by a variety of opinions, many of which have been colored by the peculiar outlook or primary interests of the sources from which they have emanated.

We have heard it said, for instance, that speed is the only thing which an airplane can offer as an advantage over other vehicles of transportation. This line of reasoning overlooks certain facts which are crying for attention among airline operators, and, to perhaps a lesser degree, among private and industrial owners. Equipment in many cases has been bought on the theory that a higher speed of travel than was possible in surface transportation was quite enough, only to discover in actual experience that such matters as safety, economy, payload capacity and flying qualities (all of which are combined in efficiency) are, in the final check-up of profit and loss, tremendously important.

Efficiency is the answer. And this philosophy of aircraft efficiency must inevitably find its way to the air races. Even though a manufacturer may know pretty well what his airplane is going to do in the races which he has entered, basing his predictions upon private tests, the element of competition before a more or less critical audience places a very special importance on the contests themselves. This is particularly true of the races held for stock models, whether for speed, efficiency, or both. But if we are to assume that stock models are, strictly and honestly, stock models—then it is evident that the efficiency contest, conducted in public and in open competition, becomes more than ever a test of the highest and most far-reaching value. Efficiency becomes not only a matter of giving the public what it *needs* (and what it eventually will want and demand), but it goes to the very essence of air transportation. For we must not forget that efficiency is never divorced from speed—particularly in an air race. Indeed, the efficiency figure of merit is—and rightly should continue to be—worked out in terms of speed combined with payload-carrying ability, take-off distance and fuel consumption (or size of engine).

The general attitude toward efficiency contests, within the industry, has undergone considerable change and correction during the last nine years. Our first notable public airplane contests after the war were held in 1920 at Mitchel Field, New York. Until 1925, practically all public air racing in this country placed emphasis on speed for speed's sake. Beginning in 1926, a decided trend became noticeable toward efficiency contests, perhaps because, primarily, it became apparent in the 1925 Pulitzer Race (once more at Mitchel Field) that speed racing was getting a bit out of hand: the expense of speed, alone, was growing rather great! Already, in 1922, two important trophies had been placed before the race managers as an incentive to efficiency contestants. And if each of these at first was offered on a deed of gift that left much to be desired from the standpoint of efficiency competition, they both in a few years were made the subject of race regulations which have given a satisfactory definition to the idea of commercial airplane efficiency. These two trophies are still America's outstanding efficiency awards—the Detroit *News* Air Transport Trophy, and the Aviation Town and Country Club Trophy—and a glance at their history throws light on all the foregoing remarks.

The Detroit *News* Aerial Mail Trophy was presented by the Detroit *News* to the National Aeronautic Association on April 3, 1921. The purpose of the donor was to encourage the transportation of mail by air, and to provide a fitting reward for the development and the piloting of mail planes at the annual races. The trophy was not competed for that year. Its various winners are described below. On May 13, 1925, the original deed of gift was changed in order to expand the scope of the race and further to encourage the development of passenger transports as well as mail carriers. Thereupon the name was changed to that now used—Detroit *News* Air Transport Trophy.

The Detroit *News* deed of gift appoints the National Aeronautic Association as custodian, permitting its committee to amend or change the rules and regulations if,





Detroit News Air Transport  
Trophy for efficiency

air races were for the first time held in a big way. Under the title of "Detroit News Aerial Mail Trophy," the race was limited by its rules to multi-engined planes. Unfortunately, the main planes of the day were practically all of the Liberty-powered single-engined DH type, and the whole object of the donors was lost. Five Army planes were therefore the only participants, including four Martin bombers and a Martin transport. Ten laps were flown over a 24-mile course, and the event was won by the Martin transport, piloted by Lieut. Erik Nelson, at an average speed of 105.1 miles per hour. Little or no attention was given to efficiency.

The next year, 1923, during the St. Louis Air Board's races at Bridgeton, Mo., the event was strictly limited to U. S. air mail pilots with regulation service planes. It was won by a DH-4, with a 400-horsepower Liberty engine, J. F. Moore up, making an average speed of 124.98 miles per hour over a six-lap 50 km. course. Other than an increase of speed, the significance of the race remained unchanged; and in 1924, at the National Air Races staged at Wilbur Wright Field, Dayton, O., it was again scheduled to be run for air mail planes exclusively, but there is no record of the race for that year.

As already mentioned, in 1925 the deed of gift was changed. The event was run in October at the National Air Races, Mitchel Field, L. I., N. Y. A new title, Detroit News Air Transport Trophy, was introduced, chiefly because the Government was planning to let contracts for air mail carrying to private operators, and it was hoped that commercial planes would compete. But the Army and Navy again were the only participants, and once more the trophy was taken by a service ship, an 800-horsepower Huff-Daland bomber piloted by Lieut. E. E. Harmon, at an average speed of 119.91 miles per hour over 120 miles.

At last, in 1926, the Detroit News Trophy began to take on its true importance at the National Air Races, Model Farms Field, Philadelphia, Pa., where it was opened wide to commercial airplanes. Contestants were required to carry a useful load of at least 1,000

pounds. The event was divided, for speed and for efficiency, and was run over the usual distance, 120 miles. For the first time, the trophy was won by a commercial plane. Both for speed and efficiency, first place was taken by a Bellanca cabin monoplane, piloted by Lieut. C. C. Champion. The results were as follows:

Pilot	Airplane	Speed m.p.h.	Efficiency
C. C. Champion...	Bellanca	121.531	(1st) 896
L. G. Meister...	Buhl	119.987	(3rd) 624
R. W. Schroeder...	Ford Trimotor	114.262	(4th) 427
James G. Ray...	Pittcairn	103.456	(2nd) 736

Since the Philadelphia race, the handling of this event has remained substantially unchanged; each year it has been held as a fixture of the National Air Races, in the two divisions of speed and efficiency, with a growing importance on the efficiency section. In 1927, at Felts Field, Spokane, Wash., three contestants entered, and the speed section was won by Capt. Frank Hawks, flying a Ryan monoplane—the efficiency section by John H. Miller in a Hamilton. The results follow:

Pilot	Airplane	Speed m.p.h.	Efficiency
Frank Hawks...	Ryan	104.837	(3rd) 905.011
Jack Frye...	Fokker	100.065	(2nd) 918.727
John H. Miller...	Hamilton	96.080	(1st) 925.587

Interest in the efficiency aspect of the Detroit News Trophy race—indeed, the efficiency idea in all races—appeared to a striking degree at Los Angeles. In 1928, at the National Air Races on the West Coast, this event was staged as an unlimited free-for-all, but it is interesting to note that it was held for civilian planes only. The field was large, and hotly contested. A sharp demarcation was shown between the planes which proved themselves fastest, and those which put up the greatest performance as measured in terms of efficiency. The highest speed yet registered in the Detroit News Trophy races was set by Robert Cantwell's Lockheed, powered with a Pratt and Whitney 425-horsepower Wasp, averaging 140.3 miles per hour. The efficiency section, on the other hand, was led by a Bellanca six-place cabin monoplane powered with a Wright 220-horsepower Whirlwind, followed by a Fokker Super-Universal Wasp job, the two efficiency leaders being far ahead of the field on figures of merit, yet turning in a speed of 97.79 miles per hour and 110.06 miles per hour, respectively. The results at Los Angeles were:

Pilot	Airplane	Engine	Speed m.p.h.	Efficiency
R. Cantwell...	Lockheed	Wasp	140.3	(5th) 515
A. Goebel...	Lockheed	Wasp	139.7	(6th) 446
L. Schoenhair...	Buhl	Whirlwind	117.9	(3rd) 603
C. Collyer...	Fairchild	Wasp	117.7	(8th) 352
L. Meister...	Buhl	Whirlwind	116.3	(4th) 567
J. Frye...	Fokker	Wasp	110.0	(2nd) 826
V. Dallin...	Bellanca	Whirlwind	97.7	(1st) 863

The recent National Air Races for 1929, at Cleveland, included a larger number of efficiency contests than ever before, i. e., contests in which the award was based upon a formula involving speed, payload-carrying ability, take-off distance and gasoline consumption. This seems to be a good omen for the progress to be expected in airplane design and construction of the immediate future. Builders of commercial planes apparently are beginning to turn their thoughts back to efficiency.

The conditions of the 120-mile Detroit News Air Transport Trophy race, as flown at Cleveland, again opened the event to transport type planes regardless of horsepower; required that each contestant must carry the full load shown on the airplane

(Continued on page 292)



Aviation Town and Country  
Club Trophy for light planes



# PRESENT STATUS OF COMMERCIAL AERONAUTICS IN EUROPE

By Hon. Clarence M. Young

*Assistant Secretary of Commerce for Aeronautics*

**P**RACTICALLY every important capital in Europe is now served by one or more airlines. Austria, Belgium, Czecho-Slovakia, Denmark, Finland, France, Germany, Great Britain, Hungary, Italy, the Netherlands, Poland, Russia, Spain, Sweden, Switzerland, all are utilizing aircraft. Despite the handicap of numerous nearby international borders, air commerce in Europe has grown steadily.

Last year, German planes, for example, flew 7,030,565 miles, carried 115,000 passengers, handled 1,130,000 pounds of mail, and transported 4,282,000 pounds of baggage and express. France was not far behind with 3,753,133 miles flown in regular service, 21,000 passengers carried, 1,607,280 pounds of mail and 2,755,000 pounds of baggage and express. Although the figures for other European nations might also be cited, suffice it to say that practically every country in Europe is making large strides in civil aeronautics.

Last year, for example, the postal administration of Spain started a service whereby mail for international air transport is received by Spanish postoffices for sixteen different European nations. The Italian government is encouraging the use of private aircraft, both of national and of foreign registration, by providing airport facilities and services. During the first three months of operation of the through lines, more than five tons of mail were carried between England and India. Great Britain has, in addition to its numerous scheduled airlines, thirteen subsidized flying clubs and five independent ones. These subsidized flying clubs at the end of 1928 had 3,288 members, as compared with only 780 three years earlier, and now have 420 qualified pilots.

As an instance of the services available in Europe, air mail from Berlin is delivered in London by noon of the following day. On the return flight, mail leaving London at 8:15 in the morning arrives at Berlin at 5:25 the same afternoon. A combination of train-plane service permits the transfer of mail between Berlin and Barcelona, Spain, in twenty-four hours.

As an example of the rapid developments taking place in European air commerce, consider the history of a single company in Germany, the Deutsche Luft Hansa, which started operating thirty airlines in April, 1926, and added twenty-four additional lines within a few months. This

number had increased to ninety by the summer of 1928; of these, eighty-four were operated by the company and six were maintained in coöperation with foreign countries.

Special express services are now operated between London, Amsterdam, Hanover and Berlin and between Paris, Cologne, Easen, Mulheim and Berlin. As the result of an agreement entered into between this company and the German Imperial Railways, express can now be sent to any place in Germany where there is a railway station, through the combined utilization of air and rail transport. Following the successful introduction of the through air and rail service in 1927, the Luft Hansa arranged with the German railroad company for the transfer of passengers effective September 1, 1928. Passengers may start a journey by air or first-class railway and change to the other at will, and with but little formality.

The Imperial Airways, Limited, of London, maintains a regular passenger, mail and express service between London and Paris—a distance of 225 miles—making one to five round trips per day. During the eight years ended March 1, 1929, Great Britain's government spent approximately \$19,000,000 for the promotion of civil air transportation. In Germany, too, the national and local governments aid generously in the promotion of air transportation—spending some \$20,000,000 annually for this purpose. France's 1929 appropriation for aeronautics amounted to over \$70,000,000.

Because of the steady growth of air transportation in Europe, there have been developed a number of excellent airports. Three of these airports are outstanding: Croydon at London, Le Bourget at Paris, and Tempelhof at Berlin. Each is approximately 400 acres in area, has similar ground equipment, accommodates similar traffic, and exercises about the same type of control over activities. Moreover, the respective governments of all three adhere to the International Convention of 1919 which makes them all amenable to practically uniform regulations. There is a sufficient difference in the local management, however, to warrant separate reference to each.

## Croydon Airdrome (London)

The Croydon Airdrome, which is frequently referred to as the London Terminal Aerodrome, is located near the village of Croydon on the outskirts of London; it is within about one mile of a suburban train station, and can be



Assistant Secretary Clarence M. Young



Loading freight on a Fokker of the Royal Dutch Airlines

(Continued on page 250)





Aerial view of the 2,400-acre site of Randolph Field, Texas, where the Army Air Corps training center will be located. The rectangle in the center is the building area, surrounded by the flying field. The arrangement of streets, quarters, hangars, etc., is presented in plan view at the bottom of this page.

## THE WEST POINT OF THE AIR

WITH a network of streets laid out and practically all utilities installed in the 2,400-acre field,

By Gene Smith

actual construction work on the "West Point of the Air," Randolph Field, sixteen miles from San Antonio, Texas, soon will be launched. This field, built at an initial outlay of more than \$11,000,000, will be the most complete and modern air training center in the world. In many quarters, also, this undertaking is considered to be the first step taken by the Government toward the creation in a few years of a four-year military academy for a unified flying service for both the Army and the Navy.

Regardless of what the action of Congress will be in the creation of this new aviation military academy on a par with West Point or Annapolis, for the present Uncle Sam is making provision for the centralization of the Army's heavier-than-air training activities, both in housing and training facilities, on a scale never before undertaken by any nation. The first unit of construction, which includes 123 buildings, is to be begun soon; and in two years' time the whole program of 512 buildings is expected to be completed. Ultimately, the Government is expected to spend from \$30,000,000 to \$50,000,000 on the project, and the annual cost of operation will probably amount to about \$11,000,000.

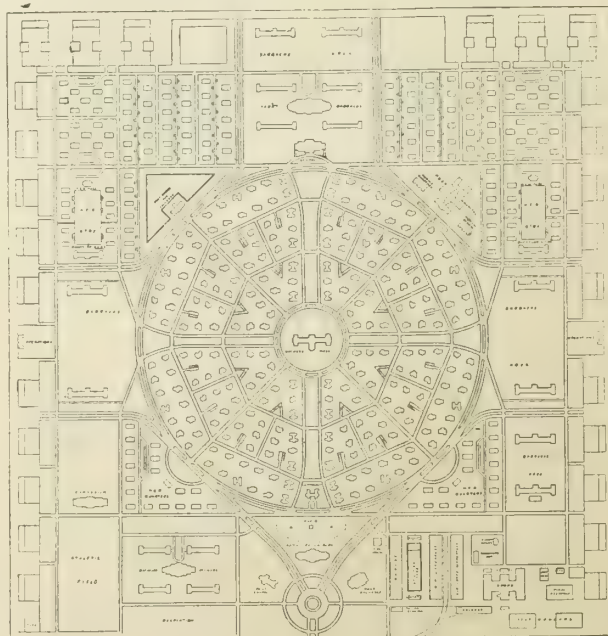
The most advanced of proved ideas in aviation will characterize the new West Point of the Air. Principally, a new departure is being made in placing the building area in the approximate center of the vast field, which is almost hexagonal in shape. This building area, which comprises 450 acres, is almost a square, with operating hangar

lines on two sides, the northeast and southwest. These hangar lines parallel the prevailing wind, which is southeast

during eight months of the year. Plans for the field also call for a third line of hangars on the southeast side of the area. However, since the handling of 300 student-manned planes from one field at the same time presents a problem in air traffic that cannot be solved on paper, only two sides will be built up at first, these to care for the Primary Flying Schools now housed at Brooks Field, Texas, and March Field, California. Should actual experience demonstrate that there will be room for the third unit—the Advanced Flying School, now at Kelly Field—it is likely that the original plans will be carried out in full. If this third side is not built up, however, the symmetry of the field will not be destroyed, for plans have been made with this contingency in view.

The other side of the building area, fronting on the main line of the Southern Pacific and facing the Old Spanish Trail, will be used for the main entrance to the field, with the administration building in the center of the entrance into the area. The main traffic artery will enter the building area at the center of its northwest boundary and divide to form a large circle 2,500 feet in diameter around the center of the post.

The building area may be compared to the hub of a great wheel. In the geographical center of the circle is to be the officers' mess, and radiating from the center will come the officers' quarters. The circle, representing about half the entire width of the whole area is surrounded by the square, which is to include the



Plan view of the arrangement of the building area at Randolph Field



remainder of the buildings of the whole field. Each one of these corners is planned so as to be almost an entity in itself, yet closely related to the whole building area.

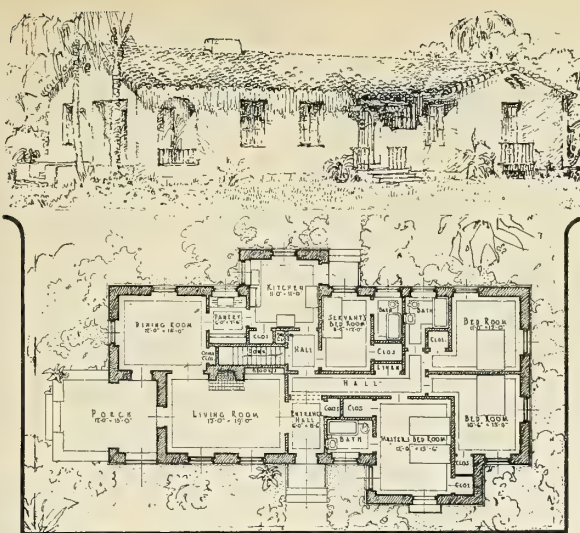
The center of the entrance to the field will be the administration building, which will strike the keynote of the field because of its location and its size, 300 by 130 feet with a tower rising to a height of 175 feet. This tower will house the field's water supply tank, which heretofore has been one of the unsightly features of most fields. Also located in this tower will be the meteorological station for the field, reached by an elevator. A rotating beacon, one of the most powerful in the country, will be mounted atop the administration building.

The second floor of this building will provide space for the commanding general of the Air Corps Training Center and his staff. The central space on the first floor will house all the signal activities, including the signal office, meteorological office, radio receiving station, telephone exchange, telegraph office, postoffice and printing plant, and the quartermaster administrative office. In the east wing of the building will be the photographic laboratory, courtroom, and the judge advocate's office. In the west wing will be the post theatre and auditorium. The cost of this building is expected to be around \$250,000.

Flanking this building at the left of the main entrance will be the post chapel, and just across the traffic artery the post exchange is to be located.

The northwest corner of the entire area is to be devoted to the industrial section—the garage, warehouses, engineering shops, bakery, laundry, etc. Opposite this section, in the northeast corner, there will be a bachelor officers' area, consisting of four dormitories grouped around a central mess.

At the southwest corner the hospital,

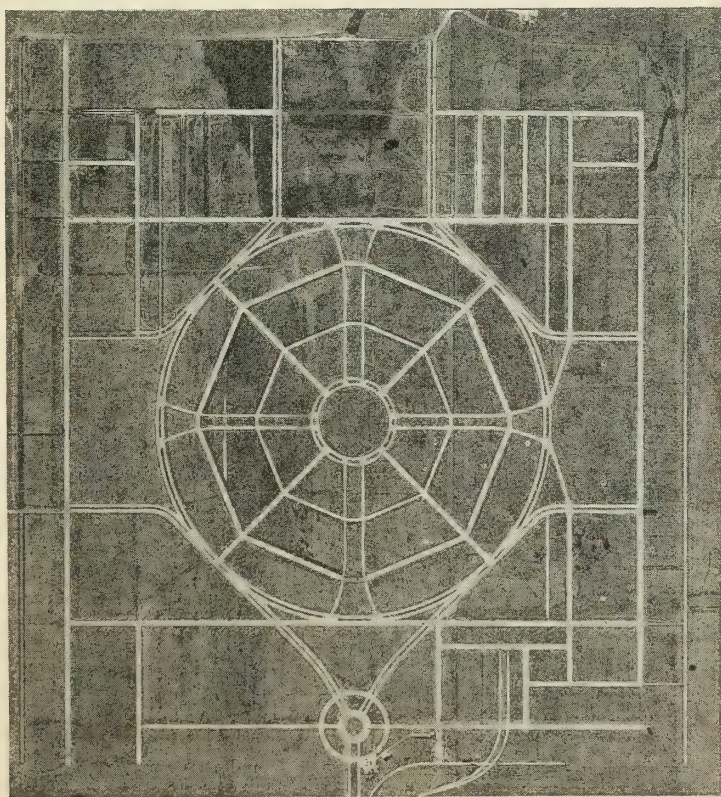


Architect's sketch and floor plan for company officers' quarters, a structure of the bungalow type

the School of Aviation Medicine, the nurses' quarters, and the non-commissioned officers' quarters will be built. In the southeast corner will be the public school for children, with its large playground, and more quarters for non-commissioned officers. Barracks areas are located just back of the site for the operations office in the center of each hangar line. At the center on the southeast boundary will be located the academic building, or ground school, and the barracks for flying cadets. Interspersed in the areas, athletic fields and recreation grounds are to be laid out.

The entire building area is to be developed in the

modified Spanish type of architecture, so characteristic of the entire Southwest of stucco and brick construction. The Government is carefully landscaping the field, and every foot of the building area is being planned, not only for utility and efficiency, but for beauty as well. The residence area in the center, where the officers' quarters are to be located, is expected to vie in beauty with that of any city. Of the acres of woodland acquired when the property was purchased only a few motes of gigantic live oak trees in this area have been allowed to stand.



Vertical aerial photograph of the building area of Randolph Field showing the roads that have already been constructed, as well as the general layout

In the event that the three sides of the field are built up, there will be twenty-six hangars, capable of housing eighteen to twenty planes depending on their size. Each hangar will be provided with a concrete apron, 150 feet wide, and the entire field ultimately will be sodded with Bermuda grass, a thick carpet-like turf that is practically evergreen in the climate of the San Antonio section. In case the third side is not built up, the number of hangars will be reduced to twenty.

Stretching a way from the hangar line—in fact, in all directions from the building area—is the field itself, a beautiful table land,

(Continued on page 244)



# THE RELATION of COLOR to VISIBILITY AS APPLIED to AIRCRAFT

**S**AFETY is still the paramount factor in flying today—and color plays an important part in safety. The aircraft public, its customers and prospects are continually inquiring "Is it safe?" "How safe is it?" and so forth. Proper color design plays an important part in making aircraft safe.

It will be remembered that during the war a number of our engineers, among them Mr. Edison, Dr. Max Luckiesch, Dr. Maximillian Toch and Mr. A. L. Jones, developed methods of painting vessels so that they could alter the apparent size, dimensions, direction of course and speed of travel. They were able to do this through the study of relationship between area, proportion and color. That is, by applying a definite amount of blue and yellow in certain areas on the side of a ship, they were able to make it appear very long, very low, and lying much farther to the right of its actual position on the sky-line. These methods were known as camouflage or dazzle painting.

It is logical for us to assume that in aircraft painting we could unconsciously design the color area and proportion so that the line of flight and perhaps its appearance would be distorted and quite possibly, disguised. We must take precautions to avoid anything of this kind. Everything possible must be done to increase the range of accurate visibility of our ships. We must know definitely, that in doing a job, we are giving it an appearance which will enhance rather than detract from its true appearance in the air. With these thoughts as a basis, the Pittsburgh Plate Glass Company outlined and carried on a series of experiments designed to afford data concerning proper and improper color design for aircraft. Before starting any work on the problem, we discussed our plans with a number of prominent aircraft designers, with authorities on lighting, and with pilots.

Accordingly, we designed and set up a large room, approximately 55 feet by 55 feet by 15 feet, which we equipped with artificial illuminants, steam and smoke chutes and water, so as to be able to simulate with a high degree of accuracy any atmospheric conditions which might be encountered in actual flight at nearly any known altitude. We were able to reproduce accurately a bright sunny day typical of mid-summer, or a bright sunny day typical of mid-winter, or a thunder-shower, or a hailstorm, or an April rain or a bright night with full moon and a full complement of stars, or a dark, dismal night worthy of the best mystery climax, or a dense fog; in fact, nearly all conditions which are ordinarily encountered by the pilot. In this room we placed miniatures of various types of planes in proportionate sizes so rigged that they would be mobile in any direction. These we decorated in accordance with our prearranged schedule and observed them under the varying conditions. These results were, in the opinion of competent observers, directly proportionate with actual flying conditions.

Before I relate the results obtained, let me say something of visibility and of light in Nature. It is understood that we are concerned with aircraft visibility only as regards the ability of one pilot in the air to see another, not as regards the ability of a ground observer to see a ship in flight. There is a vast difference between the two. In this work there are two factors with which we must concern

By Bradford P. Millar

*Colorist, Pittsburgh Plate Glass Company*

ourselves. First, the character of the light with which Nature provides us; that is, the color of sky and clouds. And second, the color

of the ship itself. The first is a factor which we cannot, to date, alter; but the second can be regulated at will. It will be readily understood that we are concerned with color, not because actual hue is visible, for it is not, but because of the ability of colored surfaces to produce shadows when illuminated by various natural illuminants. It should be our purpose, in designing color for aircraft, to produce a silhouette effect; to cause the plane to stand against the sky as black against white. It is this silhouette which makes a ship visible to another pilot. If the craft harmonizes with the color of sky, it becomes a part of it, melts into it and becomes almost invisible. Natural lighting is so variable that it often is impossible to provide high visibility at all times, and, therefore, a broad understanding of Nature's lighting is our first objective.

There are two sources of light in the daytime, namely the sun and the sky. The relative amounts of light contributed by each of these is constantly changing. The sky on a cloudless day contributes from 1/10 to 1/3 of the total light received by a horizontal surface. At noon, light from the sky and light reflected from the surroundings illuminate the shadows, and tend to decrease visibility. In general, the distribution of brightness or of light and shade is the most important aspect to be considered. The shadows which the camouflager went to such great lengths to eliminate are our greatest aid. Since the sky is, so far, uninfluenced by man, it is our problem so to color our aircraft that it will afford the greatest possible contrast with all backgrounds against which it may be placed.

We established for our experimental work ten representative shades as standard. These colors ranged from blue through the greens, yellows, orange, to red. Our first step was to observe in our experimental room, a miniature plane of proper dimensions, colored throughout wings and fuselage in one solid color, devoid of any striping or masking. Each of these ten colored planes we observed under fifteen atmospheric conditions which we established as representative standards. Each color in each condition of atmosphere was observed in six different positions, stationary and in motion. This made necessary, on only the first step in the work, a total of 900 observations. Our results on solid color—that is, one color on a ship—showed the following:

Dark blue—as the color having the greatest mean visibility.

Chrome yellow—as the color having the second greatest mean visibility.

Orange, red or green—as the colors rating third in mean visibility.

Light blue or grays—as the colors having very poor visibility.

Aluminum—having the poorest visibility because of its tendency to reflect all colors thrown upon it.

These data refer to mean visibility, by which is meant highest visibility under the greatest number of atmospheric conditions. It is not feasible to design a plane having greatest degree of visibility under all conditions. It should also be remembered that aircraft

(Continued on page 266)



# SEWING UP THE CANAL ZONE

By  
James Warner Bellah

**T**HERE probably never has been and never will be a more jealously cherished corner of the world than the ten-mile strip of land that extends from the Atlantic to the Pacific Ocean between Cristobal and Balboa, bisecting the Republic of Panama and enclosing one of the greatest engineering feats of our times—the Panama Canal.

As an Imperialistic focal point of the United States, the Canal occupies a category all its own, never to be confused with the much discussed Philippines or any of our other extra-continental possessions.

That it is a gateway between the two oceans is only the beginning of the story. That its continued possession in time of crises allows of fleet maneuver and concentration gets us not very much further. That it is our farthest outpost on the south, and a very much isolated outpost, comes nearer to putting a valuation on its possession than anything else that can be said about it. And that its possession cuts the world in half, or puts it together again, finishes the tale.

Unfortunately, from a purely physical standpoint and by virtue merely of the problems of engineering construction, the Canal is highly vulnerable, and in the past decade with the obliteration of time and space that aerial development has given to the world, it has become infinitely more so.

The facts are that there are perhaps half a dozen places through the length of the Canal where one cleverly placed sixteen-pound Cooper bomb would bring its usefulness to an end pro tem. A considerable Culebra slide could be caused by such means. A direct hit on a key dam or spillway or a neatly laid egg on a lock control would do the trick.

The same can be said of the Suez Canal, of course, but to an infinitely lesser degree, for the Suez is cut through a level sandy country for the main part and does not present the problem of floating ships over mountains that the Panama Canal presents.

Bearing in mind that the primary function of the Zone



Map of lines of Pan American Airways through the Panama Canal Zone

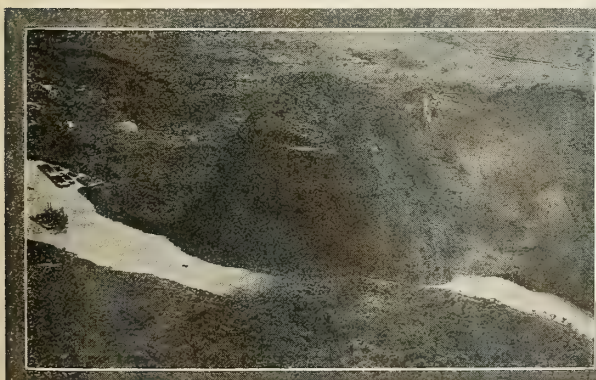
as a military project lies in keeping the Canal open in order to perform its other functions, it will come as a surprise to some of us, and bring a deep feeling of satisfaction to others, to analyze the aerial ballyhoo of the past eight months and to find beneath it one of the cleverest bits of political, diplomatic and military machination of the past century.

Eight months ago the Canal lay at the center of a circle with a radius that averaged about seven hundred miles, the circumference of which was dotted with potential airdromes on domains of a dozen different countries any one of which might conceivably become hostile at some future date. Denmark, Holland, England and France were exceedingly well represented by their own colonial island possessions of St. Croix, St. Kitts, Antigua, Grande and Basse Terre, Dominica, Martinique, St. Lucia, Barbados, St. Vincent, Trinidad, Buen Ayre, Curacao, and Jamaica—to say nothing of the mainland territories of British, Dutch and French Guiana and British Honduras and to pass lightly over the commercial aerial domination on the part of German companies of practically all the important transport lines in the northernmost South American republics. Mentioning by-the-by also, the reputation of our Central American republic neighbors for an extreme flexibility of their respective political minds.

In other words, eight months ago a plane built and piloted by, let us say, any country in the world *could* have found gasoline, oil, service, and possibly even a couple of sixteen-pound bombs, almost anywhere within that circle, had occasion demanded.

It is not implied that such a plane did, or would have. The word "could" is used.

The word "could" is (Continued on page 260)



Aerial views of the Panama Canal; left, the famous Culebra cut and, right, the Gatun dam and spillway



# CLASSIFICATION NEEDED FOR AERONAUTIC INSURANCE

**T**HINK of the vision of the author of "Locksley Hall," part of which many of us have read in the old grade-school readers! Tennyson there described the future something like this:—

"For I dipt into the future, far as human eye could see, saw the Vision of the world and all the wonder that would be; saw the heavens fill with commerce, argosies of magic sails, pilots of the purple twilight, dropping down with costly bales—"

This is the vision insurance underwriters must have if they are to play their important part in the advancement of aeronautics, as well as in the underwriting of these risks. They must feel their responsibility in helping to remove wisely and carefully all the obstacles to this accelerated business activity of flying.

The flying industry is no more in its infancy; it has grown up. I believe it is even beyond the adolescent stage. The underwriter, however, has not kept pace. As one studies the statistical tables pertaining to air transport recently issued by the Department of Commerce, it is very difficult indeed to believe that there is any such thing as underwriting a risk that will not ultimately be exposed to the aeronautic hazard.

It is obvious that underwriting this industry will never be a sound procedure until it has had an actuarial polishing. Such a finish would be hard to obtain at this stage, for Father Time and Mother Experience have furnished us with no protegee as yet old enough for us to judge his future. We must, as does the psychoanalyst, more or less speculate.

It is very likely that we would find, if we could review all the decisions that have been made concerning the underwriting of the aviation hazard, that over 50 per cent of them have been in error. This, of course, has produced unfair action to either one of the parties concerned. As a result of this, there has been a regular millennium of competition which in the near future some of the companies are going to recognize as the basis for their losses in this branch of the underwriting.

Sound underwriting means system and system means classification. Underwriters should endeavor to place the aeronautic industry in some great classification in which they already have experience. Its logical place is with those industries representing transportation and communication. It differs in no great respect from its sister industries, especially the railway and the steamship.

Not all individuals connected with either of these industries are insured on the same basis. They are classified according to their duties, and a rating commensurate with the extra hazard is placed thereon. This extra premium is accepted today more or less without question. It should be remembered, however, that these extra premiums were not charged from the very beginning but, on the contrary, the old trial-and-error methods were used before experience. Yes, even before the actuary!

As remote as it might appear, there was a time when it was considered almost suicide to ride in anything that was not man or horse drawn. Slowly, very slowly, however, the public gained confidence and the companies gained experience, until today insuring the railway or steamship

By Dr. William B. Smith

*Assistant Medical Director,  
Connecticut Mutual Life Insurance Co.*

industry causes no more extra effort than insuring the average man in the street. Think of the real hazard to be found among insured lives using automobiles.

And how many do not use this means of transportation? Here the hazard is really great; but does the underwriter hesitate with each applicant to wonder whether he is going to drive an automobile or use one, and if so, where, how often and what kind of an automobile he is going to use? Furthermore, an examination of mortality risks would probably not divulge any extraordinary deviation from the mortality tables which departure could be attributed to the automobile industry.

It has taken years to collect, study and compile the data which furnishes the basis for the underwriting of the sister industries. For more than twenty-five years we have flown, but any real attempt to insure lives in which the flying hazard enters is not much over five years old.

Again let me repeat, there is no real difference between the aeronautic industry and its sister industries. Therefore, instead of wondering how to insure this industry twenty-five years after its inception, underwriters should be applying the very same principles and practices which they use in insuring other sister industries, cognizant at all times of the one extra hazard, motion in the third dimension. This hazard decreases rapidly with the developing of safety factors, many of which are perfected today. There is one thing that those underwriting aviation must do; namely, begin to think in terms of the air instead of the ground.

In order that we might more specifically compare it to one of its sister industries, it would appear that aviation compares most favorably with that of the motorboat and steamship. The railway is concerned only with the land and comparatively short distances, while the steamship industry has only the water hazard to be considered and much greater distances. There is, however, in the air the problem of considering both the water and the land hazards and a radius almost boundless in much less time.

The public is only beginning to fly in a commercial sense. Any company considering aeronautic risks will no doubt find that by far the largest percentage are still those who have to do with the industry, such as its executives, employees, pleasure pilots, and the like. It is my opinion that we need never fear the day when the heavens will be blackened by aircraft such as our motor roads are blackened by automobiles. There are several factors involved which would indicate this to be true.

In the first place, every individual is not temperamentally or physically fit to fly. As the licensing agencies tighten their regulations, the number of persons who obtain licenses to fly will not increase as rapidly as it would otherwise.

In the second place, the private use of the airplane by the individual as he uses the automobile is too expensive,—at least at present.

In the third place, it is expensive to learn to fly and flying is just so different from driving that it will always require teaching.

Therefore, if the underwriting of aviation risks could be based more and more

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# THE AIR TOUR IN RETROSPECT

By Ralph Cram

AERO DIGEST Representative on the  
Ford Reliability Tour

IT was Saturday, October 5, 1929; the place, Ford Airport, Dearborn, Mich. The starter's flag was falling at one-minute intervals, and each time it fell a speedy, clean-lined, up-to-the-minute airplane rolled down the concrete runway and was off for its part in the fifth annual National Air Tour. Behind ropes and fences were interested crowds. Inside, those who had anything to do with what is popularly called the Ford Reliability Tour wore a smile. All the signs pointed to the most successful air tour ever held.

An undercurrent of excitement could be sensed even among the seasoned air travelers—more than 100 of them—who were to be aboard this air armada of more than forty planes. Before them lay 5,200 miles of travel over twenty states and part of Canada, with stops in thirty-one cities. Also, in the haze over there, were the uncertainties of weather, and of the performance of magnetos, gas lines, carbureters, props and engines. On the other hand, there was a certainty of cordial greetings, of hospitality, of personal and organized arrangements to give each air traveler a good time and speed him on his way with happy memories of every place he visited.

All that, however, was quite far in the background of my mind as I climbed into what happened to be the largest of the planes entered for the tour, and looked around upon what can be described only by the rather overworked term of "luxurious appointments." Since the Curtiss Condor has already been fully described in AERO DIGEST, I shall not go into particulars. The big thing with me at the moment was Memory's leap back across ten years to my first flight in an airplane. It flashed before my eyes as clearly as the "God Bless Our Home" motto in our childhood homes: "1919—Curtiss Canuck. 1929—Curtiss Condor."

What a step forward that was from the Canuck (and the Jenny) of ten years ago to the Condor of today! And all along the almost mile-long line of planes lined up for the fifth air tour were aircraft of many makes and sizes that showed the same contrast with the crates of the early post-war years. Five Fords were there, with various engine installations—three Wasps in some, three Whirlwinds in others, and the combination of central Wasp and side J-6's. Two were contestants for the Edsel B. Ford trophy; one was a service ship, and two were loaned to carry officials, news writers, the weather shark, the scorer and other officials.

In the single-engine class were the bullet-like Lockheeds, the Cessnas, later to

show surprising speed, the Wacos, soon to turn in the top figures of merit, little Moths, Great Lakes training planes of unique characteristics, Bellancas, a pair of American Eagles, two Curtiss-Robins and a brace of Thrushes, three Fairchilds, a Spartan, a Ryan, a Boeing, a Command-Aire, and a Travel Air.

No such collection of planes was ever assembled for a long cruise. The recent big shows and the Cleveland races might have duplicated them, but here they were assembled for long-distance action, and competition. Top-line pilots were at the controls, and 10 o'clock that October morning was a proud hour for Manager Ray Collins, Referee Frank Hawks, and Starter "Pop" Cleveland, with forty-one planes on the line and rarin' to go.

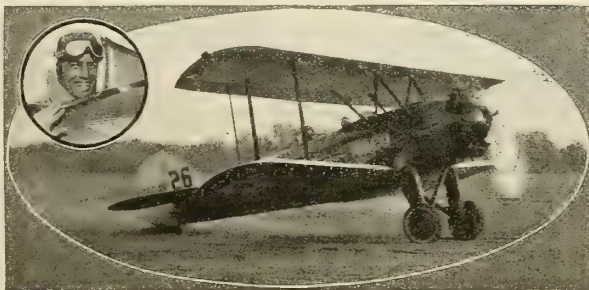
Memory of the earlier Ford tours afforded some interesting comparisons. There was the first, in 1925, with its seventeen starters, of which fifteen finished the tour. The OX-5 planes with open cockpits were in a large majority. Only one, the Fokker, with Anthony H. B. there in person, was a cabin job, and it sported the only Whirlwinds.

Next year the twenty-five starters included only seven OX-5's, and the Whirlwinds increased to six. But only three cabin jobs were entered. Another year found only one OX on the line, and thirteen Whirlwinds, while cabin planes were as numerous as the open cockpits.

Then came 1928, with only one Robin to show what an OX-5 could do: the Whirlwinds "of the type that Lindbergh flew" dominated the picture. And now in 1929 one found the once justly famous J-5 out of production, and Wasps and J-6's and Conquerors showing the insistent demand for more power, and the word "cabin" meaning little unless combined with "six-passenger," "fourteen passenger" or "eighteen passenger." Truly one needs three-league boots to keep step, even in imagination, with the way the airplanes are growing.

All this was in evidence as the 1929 tour got the flag and the planes made their initial, and very short, hop across the river to Windsor, landing on the Walkerville field. In a quarter of an hour the whole scene was shifted to Canada.

Someone in an inspired moment had included four Canadian stops in the route of the tour. Perhaps this was the most significant feature of the present year's cruise. It certainly called forth a welcome and a showing of interest across the northern border that would appear to be to the good for both countries. Soon one heard the question asked,



The Waco which won the tour, and (inset) John Livingston



"Why not Mexico next year?"

Right at the first stop, there at Windsor, the tourists came in touch with the Border Cities Flying Clubs, which were their hosts at luncheon. If it was worth something to the Canadians to see the forty-one planes from the States, it might well be profitable to the States to know more about the Canadian Light Plane Clubs. Their loyal officers and members were eager to explain the clubs to the tourists and tell all about them.

By this interesting plan, we were told, the Canadian government subsidizes civilian flying, for the double purpose of promoting commercial aviation and building up a reserve of fliers with an eye to the important part it might play in the national defense. Upon the organization of a private flying club, if it provides landing field and equipment, a competent instructor and air engineer, the government gives the club two planes. If the club buys a third plane, the government gives it a fourth. It further gives the club a cash bonus for the first thirty students trained.

The air tourists found such clubs in existence at Windsor, Toronto, Ottawa and Montreal, all four of their stops north of the border. The movement really extends from coast to coast. In each club there are from a score to a hundred civilian fliers, including many of the best young men of Canada. A fine spirit evidently permeates the organizations, and they are having a great influence on the movement to get into the air, throughout the Dominion.

Those fields on which they landed the tourists found called "air harbours" up there. Last year Canada had forty-four of them, duly licensed, and they are opening many this year. Fifty-three operating companies reported nearly 3,000,000 passenger miles flown last year. Airplanes transferred many men and much material to the northern mining camps, which largely accounts for the item of 2,404,682 pounds of "freight" reported as carried in 1928. Those on the tour who were interested in supplying Canada's needs for planes and parts and re-



Smiling Frank Hawks showed the way in his famous Lockheed

placements found this opportunity of personal contact with the Canadian fliers one of the valuable features of the cruise.

Of course there were some among the tourists who think of flying in terms of romance and beauty—of whom I am one. For them, there is nothing in all the five previous tours to compare with the flight over northern New England from Montreal to Portland, Me. They saw more scenery in a few hours than the average traveler sees in a fortnight. Flying over parts of Vermont, New Hampshire and Maine, crossing the White Mountains at 10,000 feet, they looked down upon lakes and rivers, bright hued forests, somber pine woods, quaint little towns, paved roads winding among the hills, railroads creeping through the gorges, making a scene of beauty beneath them that nothing even in last year's tour up the Pacific Coast could match. It was a glorious day for the passengers, although rather spotted weather conditions prevented some of the pilots from enjoying the scenery.

The Portland stop was marked by light rain, but those who recalled that it was the only city, because of its fog that day, where Lindbergh couldn't keep his date on his tour of all forty-eight states, a couple of years ago, realized that it might have been worse. The fleet flew out of the



Typical planes in the Reliability tour—single-motored—multi-motored—monoplanes—biplanes—open cockpit and cabin planes





Some of the pilots competing in this year's Reliability Tour. Top row, (left to right), Newnan Wadliew; Earl Rowland; William Wellborn; Al Krapish; Miss May Haizlip; Gentry Sheldon. Center row (left to right), Miss Frances Harrell; Art Davis; Mrs. and Mr. Stanley Stanton; A. J. Lacey; Charles Meyers; Robert Nagle. Bottom row (left to right), Richard W. Pear; Mrs. Keith Miller; D. Morgan Hackman; R. Wagner; Dale Jackson and Forest O'Brine

bad weather quickly, and found little weather resistance after getting a few miles out.

At Jacksonville the tour turned the fourth corner of the country, having reached San Diego, Calif., and Tacoma, Wash., last year, and Portland Me., and Florida this time.

On from there to Atlanta, with memories of Sherman's march to the sea. What a difference if they had had airplanes in Civil War days.

One Georgia newspaper man saw the pretty picture of "a bridge of airplanes" from Macon to Atlanta, for Wiley Post was landing his Lockheed at Atlanta, 70 miles away, before the last of the planes had taken off from Macon.

All around the 5,200-mile circuit the cities visited made the air tourists welcome—all with personal cordiality and some with organized plans for the transport and entertainment which successfully solved the unusual problems presented by such a tour.

There was some grouching about the reception at Montreal, where a traffic jam made it take three or four hours to get from the landing field to the hotels after the planes had flown in from Ottawa in fifty-five minutes. But later reflection led to the conclusion that getting 40,000 people out to see an air show and the arrival of the planes was worth the inconvenience to the tourists.

Springfield, Mass., was an outstanding example of an enthusiastic reception based on good organization, and at Philadelphia such experienced hosts as J. Hollingshead Taylor and the Ludington-Kellett group made the stop there a high spot in the tour.

Philadelphia scrapple for breakfast, fried oysters at Baltimore for lunch, and Virginia ham at Richmond for dinner, in one day, shows how air travelers may vary their diet.

Greenville specializes in feminine pulchritude, and had sixty of the South's prettiest girls mobilize for the dance

there. Pilots who had almost forgotten how to dance developed a lot of unsuspected footwork that night.

Atlanta had forgotten that the boys were leaving Macon on Eastern time, so the reception committee was caught unawares, and there was almost a repetition of Montreal's traffic jam. But they have real American traffic cops there, and motorcycle policemen opened a road right through the jam when the parade was ready to start.

Flying on from Atlanta to Murfreesboro, the air tourists passed over some of the lower Cumberland, a lot of rough country dotted here and there by clearings for little mountain farms, which offered hope of possible landings in case of trouble. It was easy to understand why their owners were so long under the impression that they couldn't get their corn to the market unless they reduced it to liquid.

Murfreesboro had a surprise awaiting, with its wonderful clubhouse and oversize hangar, jointly claimed by Nashville also. The tour luncheon was its dedication, with half a hundred debutantes for hostesses, and the pilots regretting that it was only a noon and not a several days' stop.

Cincinnati was full of conventions, and was chiefly memorable for the "butting-in" incident by which an Army

(Continued on page 261)



George Haldeman (center) met by his parents in Florida





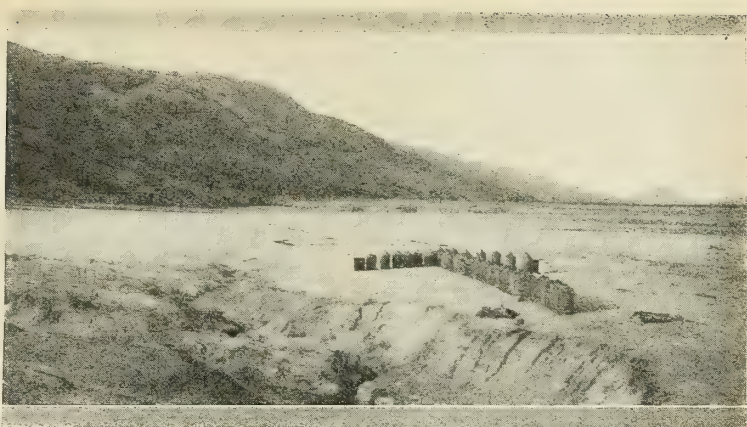


Figure 3 (left) European end of the northern flying route from America. Right, the flying field near Mt. Evans, Greenland, on the morning of August 19, 1928, when Hassell and Cramer in the "Greater Rockford" were expected to arrive

and arrived on the Greenland coast 250 miles off his course to the southward. Nevertheless, he was able to find his position upon the map and, turning northward, follow closely the border of the ice-cap until with fuel exhausted he was forced down about seventy miles from Mt. Evans.

Two great landmarks of the Greenland southwest coast are the white arms of ice which push out westward, the Frederikshaab isblink, which comes down to the sea in latitude  $62\frac{1}{2}^{\circ}$ , and the Sukkertoppen ice-arm in latitude  $55^{\circ}$  which is high up upon a plateau. These two arms of ice are the only ones which come near the sea and they are nearly 250 miles apart. Almost exactly halfway between them is the great radiating fan of fjords about the southern capital, Godthaab, and these fjords extend far inland to the ice-cap itself. Both because of their size and their peculiar plan, they have no parallel for hundreds of miles in either direction.

Flying at an elevation of five thousand feet, so as to clear the highest peaks of the coast land, the aviator coming over the margin of the ice-cap would encounter a southeast wind and, turning to the north, would fly with a tail wind until he arrived at Mt. Evans to make a

landing off Camp Lloyd on the margin of the fjord below Mt. Evans. This locality is shielded by the Sukkertoppen ice-arm from cyclones moving up Davis Straits, and as a consequence, rains and thick fogs are scarcely known in the vicinity. The annual rainfall is but a few inches, and the skies are generally clear, as has been conclusively shown by the daily balloon flights of the past two years.

The Greenland ice-cap is without mountains except close to its border, and for the most part, it is almost as flat as a ballroom floor. Along the route from Mt. Evans

to Angmagssalik, it has a maximum of between 8,000 and 9,000 feet altitude, and it should be quite possible for the aviator to navigate safely by his altimeter. Away from the

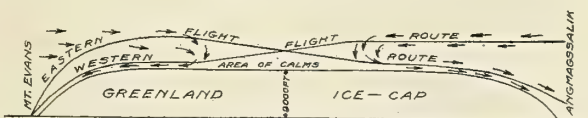
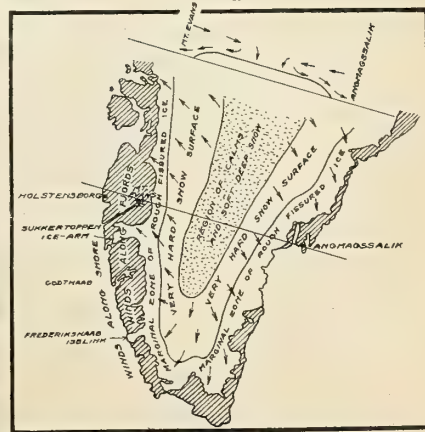


Figure 5. Section across the ice-cap of Greenland showing the direction of the prevailing winds and best flying elevations

margins, because the snow is so smooth as to be without shadow, the aviator's distance above the surface could not be gauged in the usual way.

The hop from Northwest River to Mt. Evans would be from 900 to 1,000 miles in length according to the route followed (see-Figure 2). From Mt. Evans after crossing the ice-cap and passing Angmagssalik, the flier would take a course to Reykjavik in Iceland, a distance of about 500 miles. Reykjavik has already been used several times as a seaplane base for

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Left, hut of the University of Michigan Greenland Expedition near Mt. Evans; right, Figure 4, sketch map of Southern Greenland indicating roughly the different zones; above, a section across the ice from Mt. Evans to Angmagssalik



# THE WORLD'S NEW BOSS

**M**OST of us can look back with the better eyesight of experience and discover days and moments

in our lives which turned the whole tide of fate and fortune for us, though at the time we had no particular notion that anything of special importance was befalling us. So goes it with history, whose pivotal events are rarely appreciated while they are happening but later are chosen as the milestones of human progress. The present, in fact, is usually an indigestible dish, but the wear and tear of time takes away the froth and frills and leaves at last nothing but the real meat of the situation. Then the historians come along and tell us about it.

In the mad scramble of the Twentieth Century something of enormous importance is probably happening. Nobody can be sure what it is. It may be the birth of some small boy who will grow into the leader for whom the world is waiting. It may be some unconsidered device or invention, the creator of which is looking for a job to pay for his peanuts and pickles while he works and waits for recognition. It may be some imperceptible shift in men's thoughts or a trifling change in the weather. They say it would take no more than a ten-degree drop in the average temperature of the world to start a new glacial age on its way, which might turn out to be a very serious matter, particularly since my winter overcoat has been made into a light lunch for the moths and coal is up another fifty cents. But even if this climatic calamity were on its way, most of us wouldn't be aware of it.

The Master Mind which started the world machine, and keeps it rolling, evidently does not intend that we shall know what it is all about. Tomorrow is always a mystery and today a problem, and none of us know where we are going, though we are surely on our way. But we can't resist the temptation to speculate, whether it be a matter of a three-card draw, or the story in the bottom of a tea-cup, or the trend of the times in which we live. And we find straws where we can to show which way the wind is blowing, and consider the cat to anticipate which way she will jump.

The world as a whole would like to know what the future holds for it. It would like to know whether civilization is a matter of a small dog chasing its tail or if it is really getting some place. It would like to be able to tell the difference between restless change and real progress. It would like to know whether the eventual outcome will be worth all the trouble it costs.

A wave of such speculation followed the friendly visit of the Prime Minister of Great Britain to the White House and points adjacent. Some speeches were made, and a couple of intelligent men chatted beside a camp fire, and the movie men shot off a million miles of celluloid. Everybody shook hands and agreed that it was a nice day, and Mr. MacDonald was invited to call again whenever he felt like it. That was all, or nearly all. There were no earthquakes or signs in the sky, and the sun rose and set as usual, having recovered completely at last from daylight saving.

But the instinct of the world insisted that something of real and profound importance had happened. It was not merely a matter of how long is a yardstick, nor how big a battleship should be in order to be considered a purely friendly and pacific piece of furniture. The average man in the street was not even much concerned about armament budgets and the nice problem of how to reduce

By Don Rose

a navy without making it any smaller. The average man in the street is not that kind of hairpin. So long as busi-

ness is a shade or so better than rotten, he goes right on paying taxes, hoping for the best, expecting the worst, and trusting that he will muddle through somehow. If you took him to Washington and invited him to tell Mr. Hoover and Mr. MacDonald what to do about the high cost of armies and navies, not to mention peace and parity and preparedness, he wouldn't be much help.

But nevertheless he felt sure, way down in his inner consciousness, that something of importance happened when the British lion wagged a friendly tail at the doorstep of the American eagle. And he goes right on wondering what it was.

Having nothing better nor more profitable to do, I offer an opinion on the significance of this peaceful pow-wow, which will possibly be no worse than most other opinions and quite harmless, since nobody will worry about it. And my net conclusion, less all discounts for ignorance and political prejudices, is that it means that the world has a new boss.

The new boss is Public Opinion. Mr. MacDonald came to America because his own people sent him, not to bargain and bid for treaties, alliances or trades, but to be spokesman at the White House for the best elements of public opinion in his own country. Mr. Hoover met him and talked with him in the same spirit, not as the Army's fair-haired boy nor as the Navy's interpreter, but as an appointed representative of American public opinion. They found much in common, much of hope and inspiration, much of real understanding and neighborly goodwill. It was a grand party, and we were all in on it.

I don't suppose that the chap who first made an electron jump through a hoop, and started the radio on its roaring way, had any idea at the time that he would have a hand in this thing. But by way of his devices and all their children and grand-children, the peoples of two continents were silent partners in these meetings, watching their spokesmen and weighing every word they said. It was the biggest town meeting in history, and you and I lived long enough to see it. And all the magic of the modern world, all the sober second thought that came of the war, all the world's impatience with ignorance and superstition and suspicious jealousies between nations, conspired to make public opinion the real master of ceremonies.

Public opinion had another chance to assert itself and did so unmistakably in the case of the late unlamented Mr. William Baldwin Shearer. This was strictly the Senate's party, but the rest of us were there to see. And what a sight was there, my countrymen!

Only the World's Series saved Mr. Shearer, the big bass drum of international belligerency, from some sort of tar and feathers. Not that the Senate was particularly incensed against Mr. Shearer, who under a different star might very well have been a Senator himself, but because the Senate had been through a long hard summer and was more or less in a lynching mood. Mr. Shearer came along at the moment and looked like a good prospect. He promised to make a lovely corpse. He was for the moment as generally popular as a man-eating shark, and had it not been for the interruption of the World's Series and Mr. MacDonald's pilgrimage, you might have purchased Mr. Shearer's chances in early October for a Pittsburgh beer check. (Continued on page 284)

# THE MAINTENANCE AND REPAIR OF NAVY AIRCRAFT ENGINES

By Commander Karl F. Smith, U.S.N.

*In Charge of Maintenance and Repair  
Naval Air Station, San Diego, Calif.*

**D**URING the last two years the life of air-cooled engines used in the Navy has approximately doubled. This is not a chance development but results from a combination of increased efficiency in design and expert building and from care taken of power plants in the field and in the shops.

The Navy maintains, at the North Island Naval Air Station, San Diego, a large force of men under command of the assembly and repair officer, whose entire energies are devoted to rebuilding and repairing the 400 Wasps and Hornets and 200 airplanes that come into the shops each year. Seventeen shops scattered over the east side of the island furnish the setting for these activities. Five hundred and seventy-six officers and men comprise the personnel.

In cases in which both a plane and an engine come in together for repair or reassembly, the jobs progress simultaneously. Obviously, reassembly of an engine requires the greater skill and technique, not only because of the large number of parts—1,672 in Wasps and Hornets—but also because of the fact that the engine undergoes great strain in the air, which demands scientific exactness in putting the parts together to maintain a powerful and efficient unit.

Although one can hardly expect an engine in military service to have the long life of a motor in civil use, actual comparisons are surprising. Responsibilities heaped on navy engines surpass any in civil flying. The Navy requires a combination of performance, simplicity and power which few engines can meet. The engines must be easily cooled and lubricated, with all parts as accessible as possible. The engines must be capable of starting quickly in emergencies. Air-cooled engines, I believe, will start more quickly than will water-cooled motors. Wasps and Hornets are simple in design and offer easy access to parts that may require repair. Although manufacturers in general have not paid as much attention to accessibility for repair as officers in the field would like, greater efforts are now being made to meet practical requirements. In order to get at some part, formerly it was often necessary to rip away about five other parts. Since builders recognize the difficulties in service, they are working constantly to simplify design; with the result that each new model proves more efficient than its predecessor.

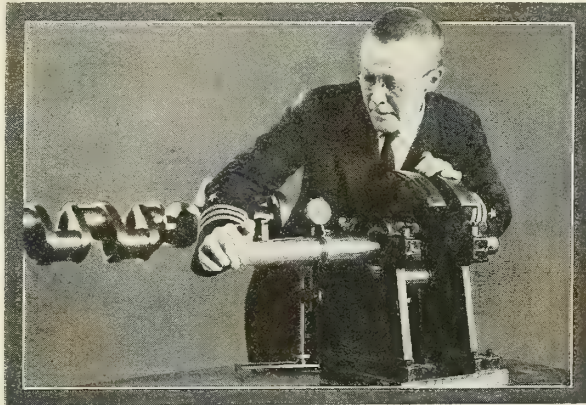
The Navy does not order engines that offer increased performance through radical change. From a service point of view, no new engine is satisfactory until it is definitely proved to be so over a long period of time.

From six months to a year are required, with navy men working in close coöperation with the manufacturer to get any satisfactory engine. Even though a motor may be quite satisfactory for civil use, flaws and bugs will frequently develop when it is subjected to the severe service of military work.

There has been considerable theorizing concerning the practical power limitations of air-cooled engines. My belief is that 750 horsepower is the practical limit for a radial air-cooled engine. Higher horsepower may perhaps be obtained from engines mounted tandem or staggered. Nevertheless, even 750 horsepower would represent an increase of nearly fifty per cent over our largest air-cooled engines now in use, which is sufficient to permit of considerable improvement in airplane performance. The industry undoubtedly will keep up with changing needs of the Navy, just as it has done to date.

Military flying equipment must, of course, be able to

stand up under the most rigorous service conditions. It is for that reason we guard with great care our millions of dollars' worth of engines, not to mention the lives dependent on them. Quite often, a military engine must operate at full throttle during a large part of the time it is in the air. Again, the engine bears a terrific strain in fighting plane maneuvers which are so necessary a part of naval aviation; to consider only one example, steep power dives from high altitudes with a sharp pull up and climb at the end. Engines



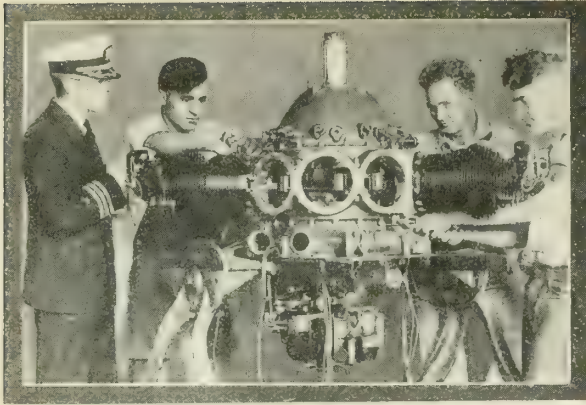
Comdr. Smith watching dial indicator while measuring the trueness of the crankshaft of a Wasp engine

in seaplanes must withstand the effects of still another element, salt water spray. Experience has shown that there is a difference in the life of engines in sea- and land-planes of the same type. Proper maintenance is also difficult on board ship where the storage conditions render it harder to service engines. This at present inexorable circumstance sometimes increases our troubles in overhauling in the shop.

These difficulties to the contrary notwithstanding, naval aircraft engines are now operated from 250 to 300 hours without overhaul, as compared with approximately 150-hour engines in service two years ago. The period of time between the first and second overhauls is as long as that before the first. Subject to the limitations of available funds and the Navy's practice of stimulating improved engine design, we overhaul every engine at periods of not longer than 300 hours or less often than once each year. On a new model, we overhaul as frequently as necessary during the first two years, provided the overhaul costs do not exceed fifty per cent of a new engine.

After the second year, the allowance for overhaul de-





Comdr. Smith supervising the reassembly of a Wasp engine

creases materially until it reaches the place where it becomes cheaper to buy a new engine than overhaul an old one. This is not economic waste, for the old motors are not discarded. This practice stimulates development of new and better engines, increases their use in service, and supplies to training squadrons engines in sufficiently good shape to meet their needs. The older types are used to the limit of their lives. When an engine finally has exhausted its usefulness and is scheduled for the graveyard, parts that cannot be used are discarded and good parts are reclaimed for replacements.

There is considerable economy in the practice of replacing cylinders or using oversized pistons to meet conditions obtaining in southwest Texas and southern California. Because of dirt and dusty fields, such a procedure is generally necessary at the end of 300 hours. For this reason nearly every engine manufacturer is attempting to develop an efficient cleaner which will not interfere with horsepower or performance. A sandy or dusty field, combined with the wide range of speeds at which a fighting plane's engine is run, gives a motor a most severe punishment. Which, of course, makes necessary more frequent overhauls.

Fortunately for our overhaul crews, pilots know more about engines than they did two years ago. They acquire the knowledge through experience and special training. As a result of increased efficiency in engines and more thorough knowledge on the part of pilots, there are fewer forced landings than a year ago. Pilots are now better able to anticipate trouble and often save a major overhaul through careful handling of an engine.

So rapidly has the Navy's air force grown, however, that during the last year the capacity of the shops has been doubled without a corresponding increase in personnel. This result was attained by a systematic study of operations, as well as by the introduction of the most modern shop equipment and methods. During the next year, by a doubling of available space, an additional fifty per cent will be added to the work capacity. Thus we shall be able to overhaul 600 engines during the year.

Every engine coming in for overhaul follows an established routine. First, of course, it is dismantled from the plane, after which work on both plane and engine is begun simultaneously, though by individual repair crews in different buildings. Because plane reconstruction is thus coördinated with engine overhaul, it cannot properly be ignored and will be discussed briefly later. Having been removed from its mounting, the engine first is sent to the engine break down department, where it is completely dismantled. Here every part, every bolt and nut,

is chemically cleaned, and inspected to determine whether it is to be retained or rejected. After all parts have been cleaned and inspected, the engine is moved on to the "sub-assembly" department, where sub-assembly is made.

The engine is taken to the floor where an assembly gang puts it together, installing all accessories and checking, inspecting and testing the finally assembled unit. From this point, the procedure differs somewhat from usual civil practice. The engine is put on the first test stand, where, using a light lubricant, it is belted in with an electric motor for five hours in order to lap bearings, cylinders and other surfaces subject to the friction of a moving part. This allows them to take their set, after which each cylinder is accurately measured for compression. Unless all cylinders balance within the limits prescribed by navy engineers, work continues until compression does balance.

Next the motor goes to the test stand, where, for a period of from five to ten hours, observers watch it to note any vibration. It is then inspected both by representatives of the engineering department and of the squadron to which it belongs, after which it is returned to the shop for final inspection, and finally installed in a plane ready for use.

Any engine is rejected for installation if the out-of-line motion of the crankshaft exceeds 3/1000-inch at the extreme propeller end. If the compression of any cylinder varies five pounds from a set standard, the engine is returned for further work. If any vibration develops on the test stand, investigation continues until that trouble is discovered and eliminated.

Generally, vibration may be eliminated during reconstruction by weighing every part and permitting tolerances only within very narrow limits. Vibration may be the result of poor timing, unbalance of the crankshaft, misalignment, poor bearing adjustment or the propeller's being out of line or out of pitch. Vibration generally does not result so much from an inherent fault in the engine as from lack of care by those working on it. Naturally, every engine will vibrate at some point in its range, but by adjustment that vibration can be thrown outside the operating range, which varies with naval



Weighing a Vought after reassembly of the plane and engine



aircraft engines from 1,500 to 1,900 revolutions per minute. Excessive vibration in the air will, of course, tear a motor apart. To avoid the possibility of such an occurrence, all adjustments are made with utmost precision.

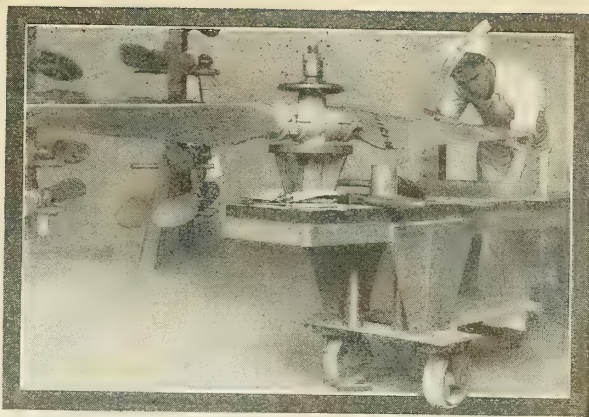
The propeller is properly part of the engine, for the full force of the power plant is applied to it. When an engine comes in for overhaul, the prop goes immediately to the propeller room, where it is disassembled and the hub and two blades weighed independently. Weight is adjusted first by drilling holes through the lighter blade at the hub and adding small amounts of lead.

Weights having been equalized, the propeller is re-assembled and the pitch accurately set within 1/10-degree on a 42-inch station. This is determined through the use of a quadrant. Then the balancer examines the contour of the blades, after which he mounts it on a mandrel, on hard steel knife edges and roller bearings, and examines for track. Every part must follow every corresponding part within 1/32-inch.

This part of the reassembly completed, the propeller goes to a draft-proof room, where it is so balanced on knife edges that it will stand in any position without moving. The blades must have no tendency to move in either direction. Should the propeller be ever so slightly off balance, perfect balance is secured by sandpapering the surface of the heavy blade. A change of only 1/8-ounce in the blade's weight is permitted from this operation. So fine is the skill required that some propeller workers demonstrate an almost uncanny intuition in not exceeding the allowance.

In all operations pointing toward completion of the re-assembled engine, closer tolerances than in any other branch of engineering are required. A tolerance of 5/10,000-inch is not unusual. This requires steady hands, good eyes and extremely accurate gauging machinery.

We have on the station a complete physical laboratory to test the strength of materials. In fact, we re-test all material irrespective of its source or previous inspections, both as received and after heat-treatment. No matter how many previous inspections a special material has undergone, we re-test and reject it if necessary. This



Balancing a propeller in the Navy shops at San Diego

practice, together with the fact that we use only special steels, adds to the total cost.

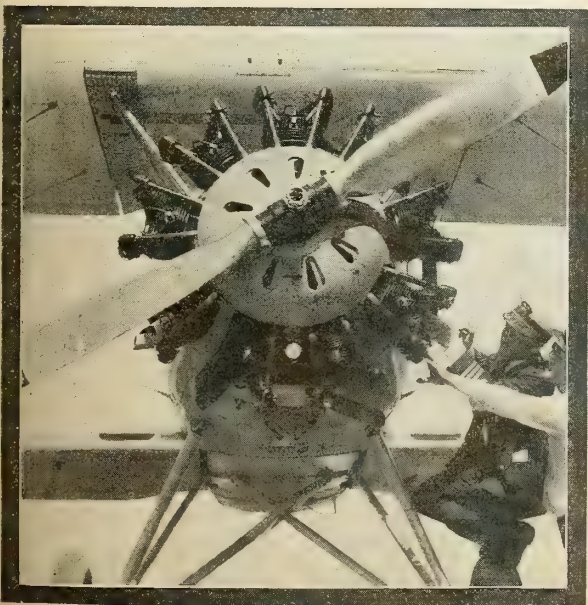
Another factor making for the relatively high cost of aircraft engines and other steel going into their construction may be noted in these facts: All airplane and engine steel is made to specifications. Yet, but little is used in each individual plane or engine. Consequently, a rolling mill with a capacity of 1,500 tons a day must halt that routine two or three days to turn out twenty tons of airplane steel. When finished, however, such metal has a tensile strength of 200,000 pounds per square inch, as compared with a maximum of 85,000 pounds per square inch for bridge steel.

I mentioned earlier our part in reconstructing the planes. This is important with reference to the engines in that some troubles charged against engines in reality should be charged against careless workmen whose job it is to rebuild the plane proper. The repair of planes follows much the same routine as that of the engines. The fuselage is stripped and sandblasted down to clean metal. Every fitting and welding is examined with a glass for signs of crack or strain. After which the ship is as completely reconstructed as though it were a new plane.

After reassembly and installation of the overhauled engine, the plane and engine (particularly the latter) are tested on the ground and in the air by two test pilots, then by the chief inspector, who represents not the assembly and repair division, but the aircraft squadron. His test is more than impersonal! Finally a test pilot representing the particular unit to which plane and engine belong takes them up for final check.

Is the routine too complicated? Do too many people have a voice and a hand in testing and inspecting? When you consider that all the experience and progress of naval aviation may be epitomized in a single machine, that our planes in the air daily represent the utmost in military aeronautics, none of these steps appear unnecessary.

Aviation always begins and ends on the ground. It begins in the shops from which its raw materials and completed units are drawn—and ends in the success or failure of those products. It is necessary, therefore, that the greatest thoroughness, care and skill be exercised in rebuilding, maintaining and repairing Navy flying equipment. Nothing that contributes to its upkeep is extraneous. In the Navy, air squadrons are organized to fly, at any and all times. Thanks to dependable engines and the best aircraft in the world, their records are brilliant tributes to the skill of men.



Final inspection of engine when remounted in the plane



# LOAD FACTOR COMPUTATION FOR APPROVED TYPE CERTIFICATE

THE Department of Commerce requirements for Approved Type Certificates contain the specification that the load factor for the high angle of attack condition shall be obtained from Figure 1, which is reproduced herewith. This mandate is literally complied with by most stress analysts. They not only base their computations on the magnitude of the load factor as represented in Figure 1, but they actually use this figure for the determination of the load factor. The procedure is half graphical and half numerical. At first, the intersections between the lines representing certain gross weights are determined and the load factor taken from the diagram for these gross weights. The load factor for the airplane under design is then, by means of the slide rule, determined by linear interpolation from these two load factors.

By Dr. Max M. Munk

Consulting Engineer  
Alexander Aircraft Company

After having used Figure 1 in the way described for some length of time, I began to meditate as to whether it was not possible to save time and effort, and to obtain more exact results, by replacing Figure 1 with simple mathematical formulae. The first requirement for such formulae would, of course, be mathematical exactness. Any discrepancy between the results of such formulae and the diagram, however slight, would render the formulae worthless, in view of the legal background of the problem. The object of the formulae, which are given below, is by no means to replace the requirements of the Department of Commerce by new ones deviating therefrom for sake of simplicity or exactness. That question is entirely beyond the scope of this article and, as matters stand, rests chiefly with the Department, so that any thought along these lines could not be more than a suggestion to

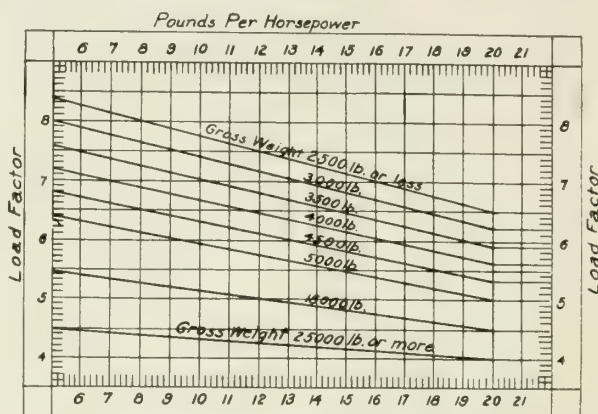


Fig 1 - Load factors - High angle of attack

This procedure is not as convenient as would be desirable, and what is more, the result is not very exact in consequence of the small size of the diagram Figure 1. This figure in Bulletin 14 measured less than one inch between the lines for 2,500 pounds and 5,000 pounds, and the diagram in the revised requirements is also small. With the figure in Bulletin 14, it was easily possible to obtain variations up to five per cent when repeating the determination of the load factor for the same condition. This error, it is true, is not excessive from a purely engineering point of view, for the question as to which load factor to use is largely one of judgment and opinion, and does not possess an exact answer. The Airworthiness Requirements are not, however, merely a guide for engineering; they are primarily a legal instrument, forming the basis for the grants of valuable certificates, involving properties amounting to many millions of dollars. From this point of view, it is very desirable that the load factor be defined more exactly than within an error of five per cent. The Department officials in charge of revising the Requirements seem to have been cognizant themselves of the necessity of improving the determination of the load factor, for in the revised edition Figure 1 is replaced by a redrawn Figure 1, although the load factors have not changed. But since there is not enough difference between the two Figure 1's, however, to give much relief, the general procedure will remain the same.

No diagram can give quite a convenient and exact answer. In a number of airplane design offices, enlargements of Figure 1 have already been prepared. To do this is to diminish the error but not to lessen the time required for the determination of the load factor. Therefore, it is apparent that any new diagram issued does better conditions greatly.

be decided on by the Department. The following formulae have nothing to do with such suggested reforms. On the contrary, the following formulae, rather than being intended to replace the old requirements, are identical with them. Only the external form of representation has been changed, and from my experience, I believe that the new form is more practical because it gives a more exact result with less effort and in a shorter time.

A simple mathematical formula representing Figure 1 can be found only if the relations represented in Figure 1 are simple, and implicitly contain it. An analysis of Figure 1 shows that they do so. The mathematical relation between the quantities involved is different for gross weights under 5,000 pounds and beyond it. In both ranges, however, the curves of equal gross weights in a system of coordinates representing the load factor and the power loading are a family of straight lines, spaced so as to vary in distance proportionately to the variations of either load factor or power loading. It should therefore be possible to find two different simple mathematical formulae, one for small airplanes below 5,000 pounds gross weight, and another for large airplanes above 5,000 pounds gross weight, representing exactly Figure 1. After some little effort, I succeeded finally in finding these formulae, and take pleasure in presenting them hereby to others, with the hope that they will be found useful.

In these formulae,  $F$  denotes the load factor for high angle of attack condition,  $W$  the gross weight, and  $W/HP$  the power loading.

The load factor  $F$  for the high angle of attack condition, as required by the Department of Commerce, is represented by the following two formulae, the first for planes of less than 5,000 pounds, the other for planes of more than 5,000 pounds.

(Continued on page 301)

# UNIQUE USES OF AIRPLANES

**A**LTHOUGH public attention and the principal interests of the aeronautical industry are

By Ralph L. Woods

now largely focused on the use of commercial airplanes for passenger, mail and express transportation, the utility of aircraft is by no means confined to these activities. The airplane is being employed in an ever increasing variety and number of enterprises because it can perform services which no other medium can accomplish quite so well. These range from aiding the tax collector of Algérie, to transporting gold prospectors into the inaccessible regions of northern Canada, eliminating the boll weevil from the Cotton Belt and apprehending bank robbers in South America. In those branches of human activity that require speed and the overcoming of inaccessibility the airplane is of ever increasing importance.

The wheat growers of the West have only recently recognized the feasibility of sowing wheat by having a plane fly low and scatter the seeds that help to make crop surplus problems. In the South the cotton growers are using airplanes to spread chemicals over the land to assist in exterminating the dread boll weevil, the South's most relentless foe.

Of indirect assistance to the farming sections of the country is the work of air pilots in detecting and giving the alarm of forest fires before they have reached serious proportions. In numerous instances, planes have assisted in rushing fire fighters to the scene and in observing the extent of the conflagration. The protection and conservation of our rapidly diminishing timber lands have been materially aided by the use of planes. The Forest Service of the U. S. Government has recently examined over 50,000 aerial photographs of our timber lands and from them expects to be able to arrive at an accurate idea of the extent and distribution of timber and also the amount of available water power in southeastern Alaska. This latter information probably has advanced by several years the development of industry in that section. The Interior Department and the Geological Survey have also employed aerial photography in those regions where ground surveying is extremely difficult. In Nova Scotia and Ontario, the Canadian government has successfully used aerial dusting of large forest areas to check the ravages of the spruce budworm. The United States Government has also used Army bombers in the Missouri River valley of South Dakota in the peaceful business of bombing river ice to prevent floods.

That the more prosperous bootleggers have used airplanes to smuggle liquor into the country from Canada has at least been suspected. The Prohibition unit in turn has used planes to take aerial photographs of roads along the Canadian border so that the much harrassed rum runner will have a more difficult time.

The case for an aerial police force has been strengthened by recent incidents in which the airplane helped to render justice swift and sure. In an effort to apprehend bank robbers who had escaped with 420,000 pesos (about \$170,000) from a San Salvador bank, Buenos Aires police commissioned two airplanes and in a short time captured the criminals. A somewhat similar case occurred at Port Washington, L. I., when a man wanted for assault escaped into the woods followed by a posse of 150 persons. A resourceful officer flew over the woods, located the accused and thereby directed his capture.

Even the tax collector has found aeronautics a valuable

adjunct to his inquisitorial functions. In Oran, Algeria, the inhabitants of oases are assessed according to the

number of palm trees they possess, and, not unlike people the world over, their declarations are sometimes only vaguely approximate. When there is reason to question such a declaration, an airplane is despatched to the property and aerial photographs are taken to ascertain without question the exact number of trees to be taxed. Thus the poor Algerian taxpayer has no escape.

In sharp contrast to the suffering and obstacles encountered by the gold prospectors of '49 is the report of a mineral exploration company operating in northern Canada. The report dwells on the successful use of planes in locating gold and other mineral deposits at points difficult of approach by land. Another example of the mining industry using planes is the recent announcement that a large English Tin Syndicate is planning to use planes in its work in Malaya, Burma and Siam. The planes will be used to transport engineers and inspecting officers between the different properties where rapid transportation has heretofore been impossible.

The prevention and elimination of disease has been abated by utilizing the airplane. Haiti has been using planes to shower Paris green and lime on mosquito areas in an effort to wipe out malaria. The state of New Jersey has also used airplanes to spray the mosquito bogs in an effort to exterminate the particularly gluttonous species that feasts on the inhabitants.

Airplanes are being used as an advertising medium. The several methods include skywriting, voice-from-the-sky, and aerial sign carriers with illuminated messages on the lower wing of giant planes.

Interurban commuters too are taking to flying. One commuter living at Ruxton, Md., near Baltimore, commutes daily to New Freedom, Pa. Frequently on a busy day he must be in Baltimore in the morning, at his factory at New Freedom by noon, in Newark, N. J., shortly afterwards, in Bridgeport, Conn., by nightfall and back in Baltimore that night. Only an airplane could serve a man like that.

A recent despatch from British Columbia pointed out how Indians of that locality who a few years back were using dog sleds are now flying airplanes to get from their villages to the trapping grounds. Several of the red men have their own planes, and air taxis are employed by others.

In Paris, during the first international congress of sanitary aviation, facts and figures were given to show the splendid achievement of airplanes in the role of aerial ambulances. This work has been particularly effective in wild, isolated and mountainous countries where skilled doctors, nurses and equipment are not available. Undoubtedly thousands of lives have thus been saved.

Planes have proved a tremendous asset in carrying payrolls in Mexico, where labor must often be paid in gold and bandits have always caused heavy losses. Where planes have been used, there has been 100 per cent delivery of payrolls.

When one considers further that airplanes have been converted into transient grocery and cigar stores, etc., have been used to carry high explosives such as nitroglycerin, and have become an indispensable part of the U. S. Coast Guard service, one may readily expect to witness their use in many other fields in the future.



# THE CIVIC ORGANIZATION'S PART IN LOCAL AIRPORT PROGRAMS

SO rapid has been the march of air transportation that every available individual, group and organization has been marshalled into action to contribute his or its part toward the conquest of the air.

Realizing that the greater portion of this development has grown in the short space of just about two years, from the smallest of beginnings to the proportions of a mammoth industry, with millions of dollars invested in equipment, property and other necessities for its operation, one can understand readily how and why this army of volunteers has been called out. And important among them, from the point of field generalship, have been the Civic Organizations. For a number of years, the United States Junior Chamber of Commerce has considered aviation development as one of its major tasks; the National Exchange Clubs have pledged themselves to active aeronautical promotion; the Elks have urged each of their clubs to place air markers atop their hundreds of club buildings, and the American Legion has taken energetic steps to have each of its individual posts take the lead in establishing airports in its respective community. All these organizations have more or less followed the instigations of the Aeronautical Chamber of Commerce, the National Aeronautic Association, the Daniel Guggenheim Fund for the Promotion of Aeronautics and the U. S. Department of Commerce, which national bodies assumed the initiative and were largely instrumental in causing these other and lesser groups to function.

Many chambers of commerce have their full-time aviation secretaries; all of them have their aviation committees. What program do they undertake? In what manner can they be of service in the promotion of airport development? To these questions the easiest answer is that the function of the civic organization in developing an airport program is unlimited, except by the ever present and woe-lful lack of finances. But it seems to me that the particular function of a civic organization, briefly stated, is one of Educational Exertion. Right now, when air travel still, comparatively speaking, is in its infancy, there is prevalent among the great masses—the voting thousands—a certain skepticism of the safety of this new means of transportation, just as this same skepticism prevailed when railroads were young. To overcome this, no matter how imagined this skepticism may be, and despite the fact that air transport ships travel safely 75,000 miles daily, requires considerable effort and thought. Here is where the civic organization best functions, first because thought doesn't drain the pocketbook, and second because the civic organization, primarily, is promotional in its scope.

But what is the most effective way to educate people to the safety of air transportation? How best can the individual be impressed with the vision of huge transport ships flying overhead, carrying men, mail and merchandise with a new and almost unbelievable speed to a destination perhaps thousands of miles away? How can people be convinced that it is to their advantage to use air transport?

We should not be too severe with the public. Those of us who are generally classed as "air-minded" understand, or think we do, what will develop from this new type of transportation, how far it will advance to our personal benefit, how great will be its influence on the nation's

By W. Gordon Kuster

*Executive Secretary of the  
Birmingham Junior Chamber of Commerce*

business, how far reaching will be its tendency to shrink the world.

But before the layman can grasp the full significance of air transport, he must acquire a new idea of speed,

a condensed conception of distances—he must adjust himself to an entirely new sphere of thought. Where he has been measuring distance in terms of Miles, he must now think of it in terms of Hours. Los Angeles is not 3,000 miles from New York, it is forty-eight hours. Birmingham is not 200 miles from Atlanta, it is an hour and a half. He must first be reconciled to these facts before he is convinced that air transportation is a new force, a vital fact, a cosmic element in our everyday life; that it is here for all of us; that it concerns the salesman and shopworker, the business man and builder, the laborer and loafer, and that we must all cultivate a friendly spirit toward its development.

This, then, is the first step in the development of an airport program by the civic organization,—that of exerting its means to educate the public to the safety, to the time saving speed, to the convenience and to the manifold utility of air travel. Once people realize these facts to be true, they will readily recognize that air travel, being a desirable community asset, will increase in the direction of those cities which provide the best facilities to accommodate it. Among many others, two outstanding examples of this airport magnetism are Columbus, Ohio, and Brownsville, Texas. Columbus was given the opportunity to become the eastern air terminus of Transcontinental Air Transport's cross-country plane-train service, if it provided a suitable airport. With this promise for persuasion, it voted \$850,000 worth of bonds and made pretentious plans for a magnificent port, hoping for nothing more than the T.A.T. line. By the time the port was finished, nine companies had made contracts with the city for its use, and were laying down cold cash for their privileges.

Brownsville was promised by Southern Air Transport that that city would become the gateway to Mexico if it had a suitable airport. It built one. There are now, I believe, five air companies operating from that port, and many planes travel hundreds of miles off their true courses to land there.

In our campaign of education, we must prove time and again that airplanes are being used consistently, successfully, and safely, for all types of service; that airports throughout the country are being operated at a profit; that those cities which have provided themselves with proper airports, designed not only for the present but for the future, are obtaining the lion's share of air travel; that in the cities where air travel prevails, there is a huge beneficial return to each and every citizen.

By what particular media are we to get over to the people all these facts? The first thing that comes to mind is publicity, newspaper stories. Fine, but how to get them? In certain communities, even the seemingly progressive newspapers are not as yet air-minded. To these newscasters, a sensational fourfold killing in a Chinese laundry is worth far fewer headlines than a plane unprofessionally washed out by a lowly Chinese in far off Hongkong. Where this condition exists, and thank goodness there are but few remaining cases that are serious, how can we rectify it?

(Continued on page 270)



# PLEASE PAGE BEAU BRUMMEL

WHAT the well-dressed aviator will wear has long been a subject of discussion and disagreement. Such leading authorities of fashion as Roscoe Turner and Ole Olson, representing the extremes of thought on the matter, have contributed nothing toward a solution of the problem, though each, in his own way, has made a picturesque addition to the lines of suitings that may be carried into the air, to the vast amusement and surprise of passing birds. Roscoe—and may his shadow never grow less!—leads the cult that goes in for the finer and flossier garments of the fashion parade; while Ole, with a sturdy and Swedish strength of character that does him credit, leaps aloft in garments that would not be out of place on one of those unshaven gentry whom one may discern admiring the scenery from the seclusion of a box-car as it trundles over the Nickel Plate road.

Between these two charming extremes lies (or flies) the great mass of us, taking off in ordinary business suits, knickers, breeches, low shoes, field boots, leather coats, sweaters, or what have you. Some of us are clean; some are covered with dust, grease and oil; some are manicured, some are not; some, riding in comfort in closed planes, still wear helmets; while others, like Temple Joyce, for example, even when flying in open cockpit planes, wear a soft felt hat jammed down over the brow so tightly that the eyes threaten to pop from the head. Still others discard head coverings entirely and leave the wind to toy at will with their long and curling locks. Some of us, like Ed Merritt, take off everything but our underwear and don a suit of coveralls; while others of us—Hal Emerick, for one—wear the heaviest procurable flying suits in the middle of summer, and resemble Teddy bears. In fact, the one thing we hold in common, in this matter of dress, is diversity. All of us are different from all the rest of us. In fact, it is safe to say that in no other line of endeavor may one don such a weird and varied assortment of garments and still be considered sane.

Do you doubt that statement? Then try this test. Collect three dozen assorted pilots, male and female, and turn them loose on an airport before an assembly of a thousand spectators. They represent every shade and variety of style in clothing from Gimbel's Basement to Bond Street. Yet none of the spectators give the matter a thought. It has come to be quite natural that all of them should be different. Now then: transport your thousand spectators to the customer's floor of a large city bank, and place your three dozen assorted pilots behind the counters—even take their helmets off, and their goggles. What is the result? The experiment has not been tried, for no banker wishes to encourage a run on his bank, but it is fairly safe to assume

By

*Cy Caldwell*

that the thousand spectators would come instantly to the conclusion that the bank was being run by a collection of madmen—and of mad women. I know that I, for one, should I walk into the Union Trust Company and find Casey Jones in knickers acting as watchman, I would instantly draw out my eight dollars. "A man with legs like that, who has no more sense than

to display them," I would say to myself, "is not the fellow to guard my money. Almost any bandit, let alone a Chicago-trained one, could outwit him." And if Roscoe Turner happened to be standing at the door, I wouldn't even think I was in front of my bank. I would come to the conclusion that I was gazing at the gaudy commissioner of a movie cathedral. In fact, Roscoe was standing on the curb before the Cleveland Hotel, during the National Air Races, when a big limousine rolled up and discharged an important-looking old gentleman.

"Doorman," he said to Roscoe, "will you bring that luggage?"

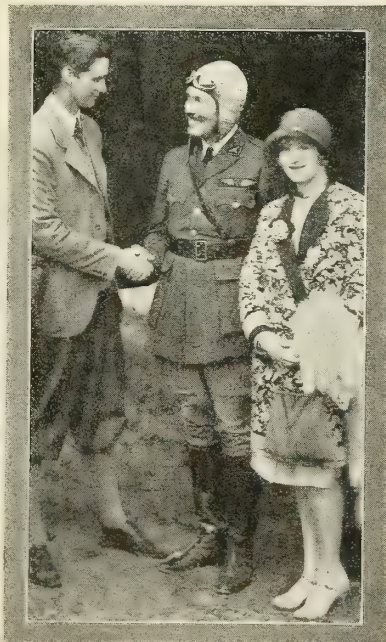
I mention Roscoe because he sets himself up as an authority on dress, as witness his letter in the National Air Pilots Association Journal. (And let me suggest right here that you licensed pilots should join our association. Send in your application to our Executive Secretary, Carl F. Egge, 1293 Blount Street, Cleveland, Ohio.)

But to return to the gaudy Roscoe; he begins:

"First tell Cy Caldwell to go jump in the lake, because I have somebody else thinking for once along the same lines that I have advocated for several years, and here's to bigger and better uniforms."

Well, I did jump in the lake, shortly after that, as you doubtless heard. But it wasn't on account of Roscoe, though I'll admit that uniform of his is enough to cause a casualty among sensitive spirits. Hear him describe it: "... myself with the said uniform, coat of French blue and English Bedford cord breeches and cap. Sleeve insignia is a small gold wing with a silver propeller embroidered. The wing on the left breast is gold embroidered with a red R. T. in the center for the organization, and the cap has the same design with the exception that it is only about half the size. The belt is a regular Sam Browne belt, and boots and puttees can be worn. For those who desire, you can have slacks out

of the same material as these breeches." Oh, I can, can I? Isn't that nice! Well, I don't want them, or it. Not any of it, Roscoe. You, I imagine, with your classic features and your Lionel Strongfort figure and your commanding air, may be mistaken by the yokels for a visiting general, inspecting the troops. But I, alas, never would be. If I, with my humble, not to say distressing exterior, should appear in any such ensemble as you affect, the small



Roscoe Turner (center), the leading authority on fashions for fliers

(Continued on page 276)



# EVOLUTION OF AIRCRAFT AND MARINE RADIO BEACONS

**I**N some respects, the aircraft radio beacon may be said to be an offshoot of the marine radio beacon, which has been in use for about eight years. Francis W. Dunmore, of the Radio Laboratories of the Bureau of Standards, deserves much of the credit for making the first crude experiments on the aircraft radio beacon. About five years ago at the Bureau of Standards, he rigged up giant loops around two telegraph poles at some distance apart, and with the aid of receiving and sending apparatus, conducted his first crude experiments. The apparatus was later taken to McCook Field (now Wright Field), Dayton, Ohio, and perfected by Army airmen.

As a result of these experiments and the practical uses to which the aircraft directional beacon had been put, elaborate programs for equipping the various air routes over the country with these beacons have been undertaken.

The United States Government is building a number of these; there will eventually be on the Government air routes alone between forty and fifty stations. At the present time there are seven in operation, they being located at Bellefonte, Pa.; Key West, Fla.; Sterling, Ill.; Des Moines, Iowa; Cleveland, Ohio; Goshen, Ind.; and New Brunswick, N. J.

Generally speaking, there are two types of radio beacons. First, there is the directional beacon, of which seven are now in operation. These operate on a power of approximately 1,000 watts. The modern vacuum tube transmitter is used. In the operation of this type of beacon, the loop is used to chart a path between the sending station and the point of destination of the airplane.

Therein lies a fundamental distinction between the aircraft radio beacon and the marine radio beacon. The marine radio beacon uses the loop to receive the signals and to determine the exact direction from which the signals come. The aircraft radio beacon uses the loop to transmit the signals and to chart a path in a certain desired direction to enable a plane flying the route to reach its destination.

There are two general principles followed in the reception of directional beacon signals. The most widely used today is that commonly referred to as "ear reception." The pilot wears earphones combined

By J. E. Smith  
President, National Radio Institute

with his helmet, and he varies the direction of his plane according to the intensity of the signal in each ear. That is, if the signal is louder in his right

ear, he varies the direction of flight until he reaches the point where the signals are received with the same intensity in each ear, by which he knows that he is directly in the path that is being charted for him by the directional beacon.

The other general principle, along which experiments are being made (and from indications some very good results are being obtained), is that known as the "visual reception." The directional beacon signals are received by a piece of delicate apparatus on the instrument board, and the pilot need only glance at it in order to tell whether or not he is running off his charted path. This, of course, dispenses with the use of headphones to receive the signals.

The second type of radio beacon is known as the marker beacon. These are to be established at intervals of 25 miles along the air routes and are frequently referred to as milestones along the highways of the air. At each one of these marker beacons there will be a low-power transmitter and an operator whose task it will be to supplement the work of the direction beacon and give the pilot flying the route more definite and specific information as to the weather conditions, the nearest landing field and other information that he may desire.

Up to this writing, the longest distance that has been flown with the aid of radio directional beacons was that

of the fliers in the Dole flight to the Hawaiian Islands. With the aid of the directional beacons planes may be flown great distances at night, or while the earth is obscured from them by fog or clouds, and still be able to reach the desired destination.

Inasmuch as the aircraft radio beacon itself is somewhat an offshoot of the marine radio beacon, and since both are administered by the Lighthouse Service of the Department of Commerce, it is proper at this time to consider the foundation of them both. Therefore, a study of the development of the marine radio beacon in particular is in order.

Since the marine radio beacon service in this country includes the installation of a total of 64 beacon stations, 12 in course of construction, and in view of the recent introduction of the first completely automatic beacon in the world, an



Harry Diamond, in charge of the Bureau of Standards' aircraft radio work, seated in the Bureau's flying radio laboratory



estimate as to the value of this aid to the safety of ocean navigation and the basis it furnishes for the further development of the aircraft radio beacon is peculiarly timely and fitting. There is no one better qualified to measure the worth of radio to the seafaring navigator than Commissioner George R. Putnam of the Lighthouse Service, Department of Commerce. He has nurtured the development of the radio-fog-signal system from its swaddling-clothes stage—when the first three installations were made in the approaches to New York City eight years ago—to its arrival at lusty maturity, with 64 beacon stations stretching along the coast of the Atlantic and Pacific Oceans, the Gulf of Mexico, the Great Lakes and other such bodies of water.

"In the 31 years since radio telegraphy was proved practicable," declared Commissioner Putnam in an authorized interview with this writer, "it is doubtful if any use of radio has been found of greater value to the services of man than the application of radio direction-finding in navigation; for in this case, as in matter of communicating with vessels at a considerable distance, radio satisfied a great need, previously entirely unfilled. When the well-known conservatism of the sea, the complications of conflicting systems and the expense are considered, the progress made in eight years in the development and introduction of this system of radio navigation has been sufficiently great to prove that a really urgent need is being successfully met."

Commissioner Putnam, in marking the milestones of progress in radio beacon service and denoting the installation of the first automatic marine radio beacon, points out how the 2000-year-old lighthouse and other visible guides for navigators are deficient. They are incapacitated when demands for their services are greatest; namely, during foggy weather and low visibility. Similar conditions reduce the usefulness of light beacons in aircraft operation. "Fog is the greatest menace to safety of navigation at sea," we are reminded by the Commissioner of Lighthouses, "and a large proportion of marine disasters, strandings and collisions have been due to fog and other conditions of low visibility."

"Lights for guiding navigators have been provided for more than 2,000 years, and within the last century many important advances have been made in illuminating apparatus, greatly increasing the brilliancy and efficiency of lights, but when fog covers the sea and the mariner is more urgently in need of help, the most powerful combination of light and lens is rendered useless to him. Until radio beacons were established the navigator never had available a means of obtaining bearings on invisible objects. There are several methods of applying radio direction-finding and directive radio to ship navigation proper. The system referred to above comprises the provision on the ship of an instrument capable of



An airway radio beacon station of the type to be established on the air routes of the United States

observing the direction of a radio signal and the installation at fixed stations or on other vessels of means of emitting radio signals which may be identified with the source from which they come."

Once the radio compass has been universally installed on ships, the Commissioner believes there will be little necessity for a continuation of the radio-compass stations on shores—for instance, the system maintained by the United States Navy. He points out what he regards as the limitations of the shore compass stations and indicates the scope of their services pending the widespread installation of radio compasses on shipboard in the following statement:

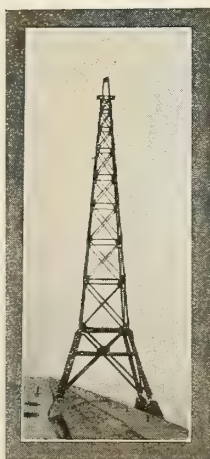
"It is true that the reverse of this arrangement has been developed; that is, a system of

placing radio compass stations on shore, taking bearings of ships, sending signals and communicating the bearing or computed position to the ship. A considerable number of such shore stations maintained by various governments, and particularly by the United States, are now in operation, and have been useful to vessels not provided with radio compasses, pending the extension of the use of such compasses on shipboard. With the successful operation of ships' radio compasses, these should no longer be looked upon as rival systems.

"The shore compass station fails to give to the navigator several of the great advantages of radio direction-finding, including the ability to take bearings of approaching vessels or of ships in distress, the ability to take bearings in any part of the world on ships or stations, and the ability to take repeated bearings at the option and under the supervision of the navigator. If dependence for the use of radio bearings be placed solely on compass stations ashore, a navigator would be deprived entirely of this valuable aid when his ship happened to be out of reach of the regularly maintained compass stations or when the vessel is not equipped for radio communication service or when meeting or seeking other vessels.

"The expense of shore radio compass stations is so great that it is unlikely these stations will be generally placed throughout the coasts of the world, and, therefore, vessels depending on this system will be served only in limited areas. On the other hand, it is quite feasible at a moderate expense to extend the radio fog signals, so far as needed, to all coasts equipped with lighthouses; that is, to all the coasts of the world. The cost of equipment is less than for first class sound for signals, and the cost of maintenance is small, because the radio signals are operated by the present lightkeepers without any increase of force.

"Besides the broad advantages of the radio compass on shipboard as stated above, there are some other important practical advantages. The shore compass system fails in the approaches to an important port, because only one ship can be served at a time and the air congestion when a (Continued on page 288)



Marine radio tower on Lake Michigan



# AERIAL PLOTTING CHARTS

AS strange as it may seem, no convenient method for laying down courses and

distances in the air has yet been adopted into general use. Although we have strip maps giving on a large scale the terrain on certain charted courses, it would be a difficult matter to lay a course for points not on the strip maps—a frequent need in cross-country flying.

Without complicating the problem by including great circle courses, let us consider a simple case. Herbert Fahy, chief test pilot for the Lockheed Aircraft Company, in planning his solo one-stop round-trip flight from Los Angeles to New York and return, desired to fly a direct compass course, disregarding the great circle course. He proposed taking advantage of the local weather conditions on the flight, which might result in his flying well to the north or south of the plotted course. In case he was compelled to fly a considerable distance off his course, he would need some means of laying a course from any point not on the charted course directly to his destination. For instance, if he found it desirable to fly one hundred miles south of St. Louis rather than a few miles north of it, as a direct course would take him, he wanted to be able to lay a direct course to New York without losing time by flying back to the north to get on his original course.

His problem would have been quite simple if he had had a suitable chart and a convenient plotting board. Actually, there are no such suitable maps or charts on the proper scale, ready for use. Obviously, we need a map of the United States about 12 by 16 inches which would fit the lap, and which would show the compass courses as straight lines, and on which would be printed a compass rose and the local variation. To my knowledge, there is no such chart in existence.

As a make-shift, H. C. Gatty, who has worked navigation with Fahy, designed a plotting chart which served the

By

Lieut.-Commander P. V. H. Weems, U.S.N.

purpose. He made use of the Universal Plotting Sheet used by the Pacific Technical University in its courses. The illustration shows the plotting chart superposed on the Universal Plotting Chart, the latter being on a large scale. Theoretically, the plotting chart ought to be drawn on the Mercator Projection. This particular chart, for use in latitudes from 34 to 41, does not allow for the increased latitude as does a Mercator Chart, since there would be little distortion for such small changes of latitude,

and since extreme accuracy was not required. The extra lines between the latitude parallels are to be disregarded.

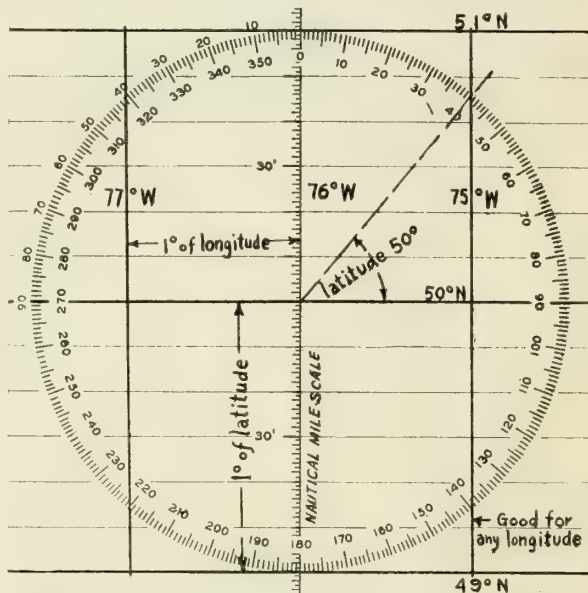
A direct Mercator course from Los Angeles to New York would lead near Santa Fe, Wichita, St. Louis, and Columbus. The true course would be about 80 degrees. If, while in flight, the plane were set to the south either intentionally or because of compass error wind drift, it would be desirable to lay a new course direct to New York rather than change the course to the left to reach the original course, then change back to the right. Suppose Fahy found himself over Hiram railroad station in Missouri. All he would have to do to get the direct course from

Hiram to New York would be to lay a straight edge between the two places, and refer this line (by moving it parallel to itself) to the center of the compass rose. He would then read the true course at the circumference of the rose. This true course, corrected for variation, deviation and wind drift would give the compass course on which to steer to reach New York.

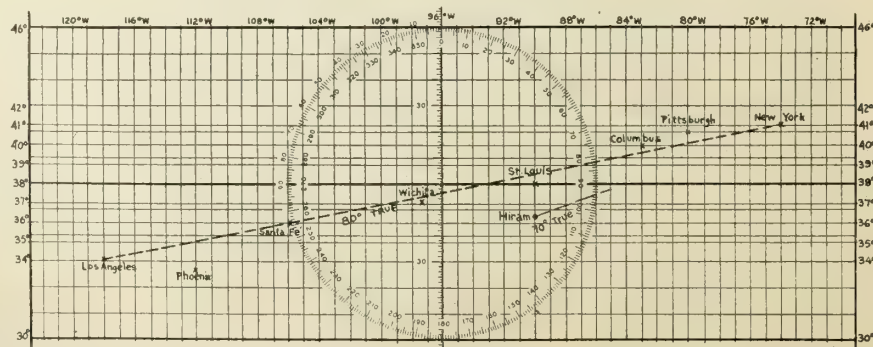
Rand McNally & Company recently has published Airway Maps for each state and for the United States, but has not to date published a convenient plotting chart of the United States to fit the lap. This company has been requested to do so, and it is likely that it will do this when the demand for these maps increases sufficiently.

There is also a need for a convenient chart board for measuring

(Cont'd on p. 259)



Section of Universal Plotting Chart as adapted to small area use



Universal Plotting Chart as used in flying a direct course from Los Angeles to New York

# AERO DIGEST

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## INVESTMENT VS SPECULATION

**I**T is deflation, not depression, which now worries the speculators, who once more are being taught that business is a heavier-than-air, not a gas-bagged flying machine. Men have been spending more time thinking about Wall Street than about merchandising products being manufactured by the nation's factories, which, with the farms, must be the basis of any real prosperity. Over-enthusiastic promises made with no performance guaranteed; public opinion propagandized to the point of bursting. That has been the trouble. Let's eliminate all that from the aircraft industry.

Let's use the same amount of effort for a year in finding and creating markets and seeing that they are promptly merchandised. We should use the same effort to sell planes that has been used in selling stocks. Having been spending much strength in Wall Street, the industry now not only should, but must, devote some to producing dividends on the stock sold. Too much security salesmanship and ballyhoo, too little product salesmanship and business.

Last year one concern we know of took on salesmen throughout the country, giving each a territory, where he was expected to discover his own prospects. Salesmen are not built that way. Occasionally one may make some sales by going gunning after customers, but speaking generally, nothing but advertising and a good office force can find out just who may be worth calling on.

Very sensibly, a few concerns this year have undertaken well organized promotional efforts. In consequence, their business will be proportionately better next year. On the contrary, those who have oversold their securities will suffer from such inevitable deflation as, while this is being written, is making many over-promoted issues in other lines sag and collapse in Wall Street.

## AIR CORPS APPROPRIATION CUT

**I**T is rumored in Washington, and therefore at every military flying field throughout the nation, that Congress may be asked to cut the Army Air Corps appropriation. It is even reported that Mr. Hoover in his suggested budget plainly requests reduction.

It would be a mistake at this time to take a step which would hinder the excellent work done by Generals Fechet and Foulois in carrying out the demands made by the people through Congress for the Five Year Program. If Army costs must be decreased, make the cuts effective on the coast artillery, the cavalry and other such fully out-dated military machines now favored by the War Department.

Anyway, the program as it stands, is fixed and should not be disturbed. The provision by Congress of a specific amount to be expended every year over a specific period is a matter very different from the demands for general-support appropriations made annually by the Army.

Rather than subtract from the money to be appropriated

for the Army Air Corps, Congress ought properly to multiply it by five, and the same service should be rendered to the Air Reserve. These are defense units that the nation most needs. Every dime spent on them is worth \$100 spent upon a floating ship. If cuts are recommended by the Budget Committee, Congress should go into the whole question with exceeding care. Having studied it thoroughly, both houses would logically decide against the cut.

Congressman Frank James favors such a careful study to disclose "whether our air defense is up-to-date; if not, who is to blame for it, and how much money will be needed to correct the error."

## PLANES OF MORE THAN HUNDRED PASSENGER CAPACITY

**O**F course we all have known that it would come, and some of us have been convinced that Europe would be first to do it. But in some American minds there was almost an envious regret the other day when news came from Germany, rather than the United States, that a single airplane had flown competently, easily and perfectly with a passenger load of 169 persons. This huge German plane set a new record for number of passengers carried at one time, surprising many by the fact that this extraordinary feat was accomplished by a plane, not by a dirigible.

The great ship circled Lake Constance, where Zeppelin's first dirigible was built, and where it flew, to the wonder of the world, with what at that time seemed incredible cargo lifting power.

Upon the very day of this air-giant's test flight, the English Air Ministry placed an order with Short Brothers, the well-known plane builders of Rochester (England), for a plane of almost similar dimensions, but of very different design. It will have three super-imposed wings and, like the Do.X., twelve engines, but is expected to be faster than the Teutonic monster of the air, with a much lower landing speed—that of the Do.X. being ninety miles an hour.

But in America something is doing also. The DuPonts announce that contracts have been closed with Dr. Claude Dornier giving this firm the rights for all his products in both North and South America. It is to be assumed that the DuPonts will merge Dornier with Fokker which is now in the control of General Motors.

## THE FORD TOUR

**W**E have many things for which we must thank Henry Ford and his son Edsel. Principal among those which especially deserve that gratitude is the Ford Reliability Tour. This year's performance showed rather more than any other that we must indefinitely continue as an annual event this interesting and valuable contest for straight excellence, as distinguished from speed and other special characteristics. It surpassed in its importance and results any of its predecessors.

Particularly, it gave the general public an opportunity to see the great advance which has been made in flying equipment and the tremendous interest which is felt in this was evidenced by the intelligently inquisitive crowds which gathered at every stop. Voluntary reception committees numbering thousands never once failed to appear. The educational effect was worth a thousand times the effort entailed and the expense incurred. If we had more tours and fewer expositions, we should have more private fliers and therefore would sell more planes. Such tours are wonderful sales agents.



# AIR—HOT AND OTHERWISE

**H**OW proud and happy must be the members of the National Aeronautic Association when they reflect that they have as their president that same Senator from Connecticut who, in these days, is so much in the newspapers. The N. A. A. slogan is: "Make America first in the air." It is much the same as his political slogan, which is "Make Connecticut first in the tariff." But for the latter cause he really is a busy little worker, apparently willing to spend anybody's money but his own. How sweet and satisfying it must be to Hi (low, Jack and the game) Bingham, to realize that the fine sound of the word "Air" rhymes with the first syllable of "Tariff." With that, his real interest in aeronautics ceases.

In working out in the national Congress any air ideas he may have, he must be dependent on the support given by the House and Senate. Even Bingham cannot pass a bill without the votes of his associates in Congress. Recently, he could not pay one, evidently, or would not, without the assistance of the national treasury. With regard to aviation, we wonder if the man who candidly admits that he put upon the Government payroll a "tariff expert" of Connecticut's manufacturers, who was already drawing pay from the clever men from whom Hi borrowed him, thinks, himself, that it is fitting that he should pose as leader of the great association which assumes to boss aviation for the industry and the nation. "Conn" is the abbreviation of his good state's name. But not all statesmen from Connecticut throughout its glorious history have been Conn-men. We note this circumstance to keep you from a stumble into error. Connecticut, from time to time, has produced some quite nice people. But accidents will happen, even in New England.

Bingham has been on the job a year without a sign that he will ever be more active than his predecessors. It is a historic fact that they have been America's best samples of complete inertia. More motionless, less actively cerebral, than the Pyramids or Sphinx, they set an example of sheer inefficiency supposed to be unbeatable. And then along comes Bingham and beats their records, apparently without making any effort whatsoever.

But it may be cheering to the somnolent members to reflect, as they turn over between naps, that they are headed by the second-best Shearer in the whole wide world. Anyway the "smug and supercilious" Hi, as one of the daily papers calls him, seems not to mind the sorry uproar he has given rise to.

A Washington paper states: "Being a particularly insensitive person and not in as tough a spot as the ship-builders, Mr. Bingham does not think his performance a serious mistake, but defends his actions as altogether proper. Probably he really thinks so. He would." The paper is puzzled as to how Bingham ever admitted to himself that he needed anyone's advice upon the tariff, for he never in the past has deigned to listen to the counsel of any individual. But one thing it finds glorious—the great Bingham, the almighty Hiram, has been soundly spanked upon that Senatorial detail where spanking is most beneficial. That is, assuming that anything could benefit Bingham.

The Oklahoma City *Oklahoman* feels that such pro-

*Bingham Crashes Again  
Women, Lots of 'Em  
James Flies 57,700 Miles  
Don't Do It, P. G. M. Brown!*  
**By Frank A. Tichenor**

cedure as the Senator's "cannot be reconciled with a patriotic desire to keep public service above suspicion."

The powerful *Charleston News and Courier* feels that Bingham's action makes it safe to "take nothing for granted."

The *Arkansas Gazette* (Little Rock): "Bingham said what he had done 'was possibly a mistake.' Universal judgment makes that absolute."

*Time* magazine, issue of October 28, had this to say: "Two terrible hours Senator Bingham spent on the witness stand before the Senate Lobby Committee explaining, trying to explain and justify Eyanson. Savage and sneering was his examination by Senators Walsh, Caraway and Blaine. When he attempted to speak in self-defense, Senator Walsh jerked him up with: 'The trouble you're in now is due to the fact that you talk too much.' He writhed in his chair and his cheeks were crimson in contrast to his white hair as the investigators spoke of 'falsification' and 'serving two masters.'"

"In the end, though, Senator Bingham was concerned into the admission that: 'I probably made a mistake.' He stepped from the stand a very wilted and word-bruised Senator. His colleague, however, had scant sympathy for him. He has never been a popular member of the Senate because he attempts to manage debate in the same wise-teacher-and-drill-pupil manner he conducted his classes in South American history at Yale."

The *Chattanooga Times* declares: "Senator Bingham was guilty of an extremely odious and reprehensible piece of business."

The *Minneapolis Tribune* frankly says of Bingham: "He is a frank, admitted, unashamed and brazen wrecker of his party's pledges."

The *Portland Oregonian*, one of the great newspapers of the Northwest: "Bingham prostituted the protective policy and his own office."

We might keep on with such quotations. We might add many words of our own without making the sins of Bingham clearer or indicating more fully that the National Aeronautic Association did a real tailspin out of control when it took him on as pilot.

A crash. No ambulances need apply. Phone for a hearse.

Some months ago when Bingham was dropped from the Military Affairs Committee and appointed to the Finance Committee of the Senate, this publication said: "Senator Bingham was taken from the Military Affairs Committee of the Senate early in the present session (which was no national disaster) and given a place upon Finance, for the Big Business of his State felt that it was waste to leave him where his job was merely to develop means of national defense at a time when his gigantic talents might find a more congenial field in the endeavor to jack up the tariff upon wooden nutmegs and other of his State's natural products."

Get this thought in your mind: The man who will subordinate the interests of the nation to the Connecticut manufacturers reasonably may be expected to be willing to subordinate the interests of our national aviation to any little selfish purpose that may happen along.

(Continued on page 256)

# AVIATION'S PROGRESS in the WEST INDIES

THERE is a singularly impressive, straight black line on the newer maps of the

western hemisphere which indicates the course and direction of one of America's most interesting airways. It is not a long line. It connects Miami and Havana. But it has that straightness and directness which only the newer form of transportation has been able to bequeath to maps. Only airlines can attain that distinction. In this feature this line is arrestingly ostentatious, and one is inclined to suspect its value somewhat until one has seen what this airway stands for in actual operation.

It is the key road to our most important and singularly successful international aviation effort. As the months pass by Pan American Airways, Inc., has been consistently meeting its promises to be continually adding to the total mileage of airlines under operation in the Pan American field. In the months of September and October this total mileage received a record boost, first in the opening to weekly service of the island route from San Juan to Paramaribo, a distance of 1,342 miles, and second, the line from Santiago to Buenos Aires which has the larger significance in providing the first direct air mail line from New York to Buenos Aires.

The total mileage now being regularly flown on the Pan American system is divided as follows:

Route	Miles
Miami-San Juan .....	1,445
Miami-Cristobal .....	2,074
Miami-Nassau .....	200
San Juan-Paramaribo .....	1,342
Cristobal-Curacao .....	1,032
Cristobal-Santiago .....	3,710
Santiago-Buenos Aires .....	732
Brownsville-Mexico City .....	472
Tampico-Merida .....	766
Vera Cruz-Tapachula .....	500
Tapachula-Guatemala .....	140
<b>Total .....</b>	<b>12,465</b>

An impressive list of routes for airway operation, no one will deny. It is in the first listed mileage, that covering the airway from Miami to San Juan, the West Indian division, that one will find the key to the success of this ever expanding system. The West Indian division, 1,445 miles long, is maintained as something of a separate model airway for passengers, express and mail, a unit apart which sets the standard for the rest of this far-flung aerial domain. One going there finds the methods and principles which obtain, or are being put in force, on the

By Francis D. Walton

other airways of the same system.

One must view the West Indian operation as something separate and distinct. It is a thing apart, above and without comparison. The speed of transportation which it has brought to the island republics grouped north and south of the Windward Passage, where for so many centuries a sail gone taut in a stiffening breeze was the only known symbol of travel, must eventually alter economic factors, international commercial relations and affect the leisurely-gaited lives of the people themselves. Much of this one can already see by a flight today on this airline.

Planes southbound lift off the international airport of entry at Miami on alternate week-days at 9:15 o'clock. The 216-mile flight to Miami is accomplished in the scheduled time of two hours and ten minutes. After a brief layover for refueling, the plane (Wasp powered Fokker F-10's have been made the standard equipment for the through run from one end of the islands to the other) leaves for Camaguey, 310 miles distant. The first day of flying terminates at the rather short, near-water airport at Santiago.

On the second morning passengers southbound are aboard for the second day of flying, which, with scheduled stops at Port au Prince in Hayti and Santo Domingo, ends at 4:30 o'clock in the afternoon at San Juan, Porto Rico.

The trick is not as easy as the recital of the schedule might make it appear, but through painstaking care expended on the selection of equipment, the training of personnel and the development of supporting ground forces, there has been perfected a system of transportation which from the point of view of the passengers hardly can be improved upon.

And this is important, for no ranking airline of the world with which I am acquainted has done so much to combine successfully the passenger pay load with the mail load. A moment of reflection regarding America's domestic airline will bring to mind the fact that at home our airlines specialize either on mail or on passengers. Usually these are distinct operations. But in instances in which the two loads are transported, one is invariably subservient to the other. Most frequently it is found that, when a successful mail line has branched out into the passenger field, the plan of operation is to carry the

different loads in different planes. Admittedly a commendable practice this, where special high speed is sought for the mail and express load, and, more important, where special, fast-flying equipment is available. But such equipment in most cases represents a special and high equipment outlay. This burden the Pan (Con. on p. 268)



Miami city officials and the crew of the Sikorsky amphibion on the occasion of the departure of the first load of air mail from the United States to Buenos Aires



# ALLEGHANY MOUNTAINS SOARING EXPLORATION EXPEDITION

ON Saturday, September 21, 1929, the Alleghany Mountains Soaring Exploration Expedition started by auto from

Akron, Ohio, for Dunbar's Camp near Uniontown, Pa. There were several aspects to the expedition; but primarily it was undertaken under the auspices of the National Glider Association as a part of its study of the Alleghanies as possible soaring terrain for national contests. Any flights that might be made were to be officially observed and recorded.

Moreover, the Baker-McMillen Company of Akron was vitally interested in continuing the test flights of the *Akron-Condor*, the soarer that company built from the plans and under the supervision of Frank Gross, recently of Darmstadt University, Germany.

What is more, it was the vacation of Dr. Wolfgang Klemperer, chairman of the Technical Committee of the N. G. A.—his first opportunity since coming to America four years ago to spend his vacation experimenting with his hobby, motorless flight, in a large soaring machine over suitable terrain.

The equipment of the expedition included an old but sturdy "Davis" which towed the trailer containing the the sailplane and which had as passengers Gross and two employees of the manufacturing company. In a second car was the manager of the N.G.A. and a glider enthusiast from Syracuse. Next in the procession was a Franklin, the property of "Big Bill" Bodenlos, Klemperer's personal mechanic and left hand man, who was chaperoned by Mrs. B. and young Jr.; and last but far from least was the

By Donald F. Walker

Manager of the National Glider Association

"Rolling Meteorological Station" manufactured for Alexander the Great by Reo but now (if it still exists) the property of the old Pio-

neer Soarer himself. As days went by, other rolling equipment came and departed, including the Packard of President H. B. Sperry of Baker-McMillen; the Buick of Walter Mosebach, Klemperer's personal consulting engineer and right hand man; the tow car of Prof. R. E. Franklin of auto and airplane towing fame, not to mention the Flivver of Frank Blunk and Mark Kearney of Gliders, Inc. Though there were better cars on that mountain, the veterans did the work and deserve fifty per cent of the credit for the results.

Previous trips and investigations had proved conclusively that west and northwest winds prevail over Dunbar's Camp and the Summit Hotel, which served as headquarters. For the first four days, we enjoyed beautiful fall weather and a keen east wind. The Weather Bureau itself had little on the expedition. Every half-hour Klemperer got his reports by radio from Cleveland Airport, and four or five times a day, the Army meteorological service at Burgess Field confirmed the fact that the wind still blew from the east. They loaned us a wind-cone and anemometer which were installed on the tower on Bald Knob.

For the first several days, we were philosophical and tinkered with improvements on a well-nigh perfect ship, completed meteorological surveys and made hasty trips over into Maryland and West Virginia to study other ridges. Wally Franklin kept the newspaper boys and the general public entertained by auto-towing flights in his veteran secondary job at Burgess Field.

On Thursday, "the Navy" arrived in the person of R. S. Barnaby, Lieut. (S. G.), who earlier had covered himself with glory by manipulating a Pruefling all over Cape Cod. He introduced the flying of high grade paper models as the chief avocation of the expedition. Finally the wind shifted to the west, and we received reports that a hurricane was coming over the mountains south and east of us.

Sunday arrived. The wind was from the west; its speed varied from dead calm to five miles per hour, hardly enough for any sort of flying. Then storm clouds piled up and Klemperer contemplated doing a "Kegel" or even possibly a "Krönfeld." The fifty-three-foot soarer was headed into the wind and the shock-cord arranged. Then the wind shifted. At last, we got set. Representatives of the N. A. C. A. had arrived from Langley Field and provided the N. A. A. Governor of Virginia as assistant timer. Moun-

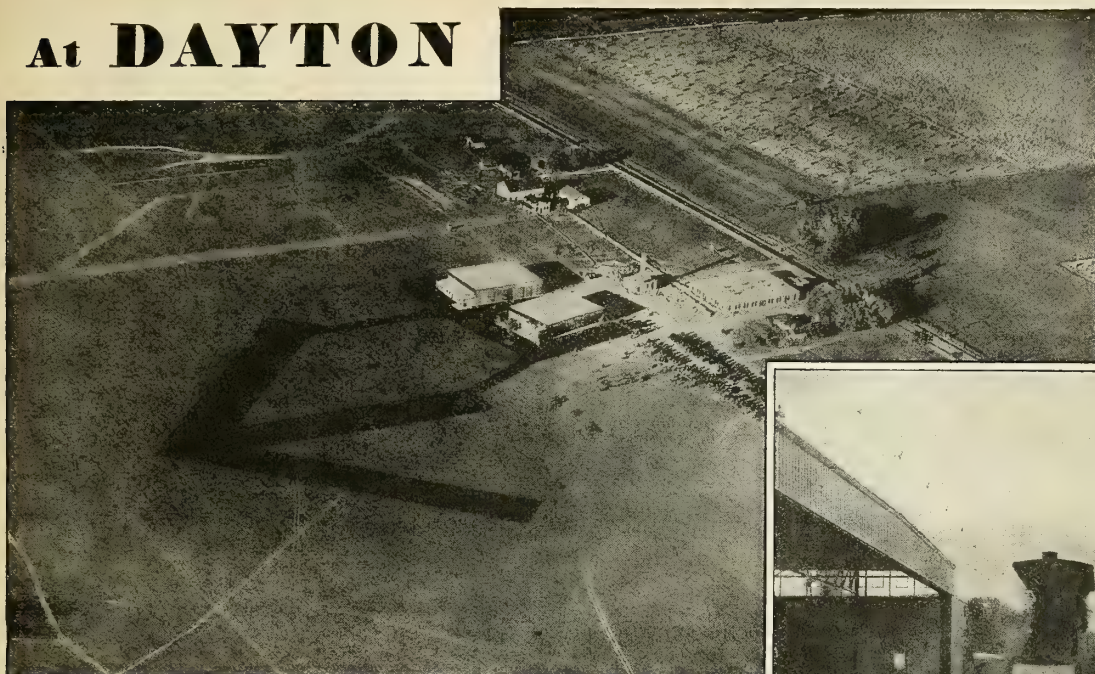
(Continued on page 244)



Above, the "Akron-Condor" being flown by Klemperer at Dunbar's Camp near Uniontown, Pa.; below, left to right, Gross, J. A. Sperry, Klemperer, and H. B. Sperry



# At DAYTON



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For more than a quarter of a century Barrett engineers have been experimenting—working—accumulating information on all phases of pavement engineering. Their experience has taught them how to utilize local materials—how to cope with local difficulties—to effect real savings.

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The Tarvia man will be glad to discuss details with you. Phone, write or wire our nearest office.

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For Road Construction  
Repair and Maintenance



*No effort has been spared to make the Dayton Airport (upper left) one of the most modern and complete airports in the country. The photo above shows the Tarvia apron facing one of the Dayton hangars.*

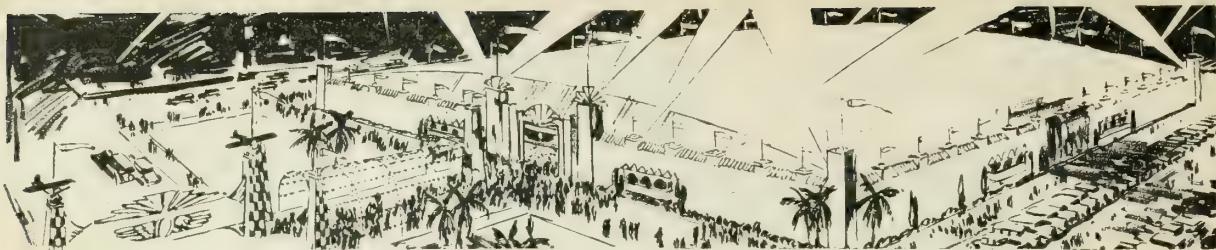
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## WESTERN AIRCRAFT SHOW, LOS ANGELES

**T**HE Western Aircraft Show of 1929, starting in Los Angeles on November 9 and continuing until November 17—both dates being inclusive—promises to establish a new standard in aeronautical expositions for the Western section of the United States.

An old exposition building located at the corner of Wilshire Boulevard and Fairfax Avenue, in the heart of one of the finest residential sections of Southern California, was completely rebuilt for the show, even the walls having been stuccoed and the roof made both fire and water-proof. This structure will form an excellent setting for the show.

The building is approximately 400 by 250 feet, one story, but of sufficient height to care for any normal exhibits. The building will supply 100,000 square feet of floor space, 60,000 square feet of which will be for airplanes, the remaining space to be devoted to aviation instruments and devices in great variety. Around the four walls will be located more than 100 large booths. The center section is divided into four huge areas for airplanes.

In each corner of the building will be an elevated stage from which radio announcements, performances and personal appearances of celebrities will be made. The entertainment or ceremony, as the case may be, will not remain stationary in any one stage, since plans are to keep the center of interest moving every half hour or so.

Unusual lighting facilities are planned, these being possible through the wealth of electrical equipment of unique possibilities found only in the motion picture studios. The lighting effects will be blended with the general scheme of decoration, and will form one of the most attractive settings for any show ever presented west of the Rocky Mountains. There is complete assurance that nothing has been overlooked to make the background most effective.

The show itself will not be the largest ever given either in size of building or number of exhibits, but there is no question but that it will offer a great deal in general interest. One of the principal features will be the display of small and medium-sized airplanes, an assembly of a most extensive collection of inexpensive aircraft. The list of big and costly ships will not be so complete, primarily because of the scarcity of display space.

The number of accessories displays is suggested by the varied list of exhibitors who have contracted for booth space. Engines promise to have the predominating representation, with instruments and safety devices a close second. One entire section of booths has been set aside for airport equipment, and this will be an exceedingly in-

teresting section of the various new devices and units for fields.

Insurance in the amount of \$2,000,000 will be placed on the exhibits at Los Angeles.

A feature conceived as an advertising proposition will be the All-California Good-Will Air Tour, which will start from the Metropolitan Airport, Los Angeles, on the morning of November 4. It will move northward up the coast line, stopping at noon at Santa Maria and for an hour at Salinas. That night will be spent either in Oakland or San Francisco. The following morning, the fliers will go on to Sacramento and turn southward to Stockton, with Fresno as an overnight stop. The next morning, the tourists will go on to Visalia and Bakersfield for lunch, then to San Bernardino and finally to San Diego for an overnight stop. Early on the morning of November 7, the procession will move northward, arriving at Mines Field, Los Angeles, before noon. This permits any participants interested in the airport operators' conventions to be on hand for the opening of the sessions.

This route and dates are tentative and subject to change, but there is no question about the trip itself. C. F. Leinesch

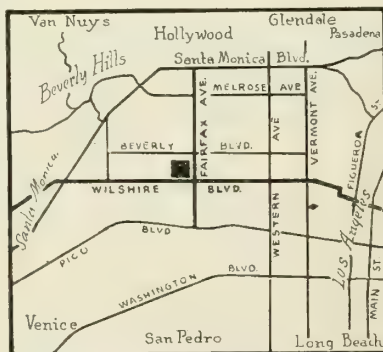
will be flight commander, and Dudley Steele will be chief of operations. W. E. (Tommy) Thomas is chairman of the good-will tour committee, and D. E. McDaniel is chairman of the entry committee.

The Junior Chamber of Commerce, directly and closely cooperating with the Los Angeles Chamber of Commerce, looks after all matters of aeronautical nature in that section of the country. The Junior Chamber is working hard in connection with the show, and doing even more in support of the good-will air tour. Its officials and delegations are handling a great many details, such as hotel accommodations at each control, local transportation, local meetings, speakers, publicity and all that sort of thing. The tour gives promise of being an amazingly successful publicity stunt for the aircraft show.

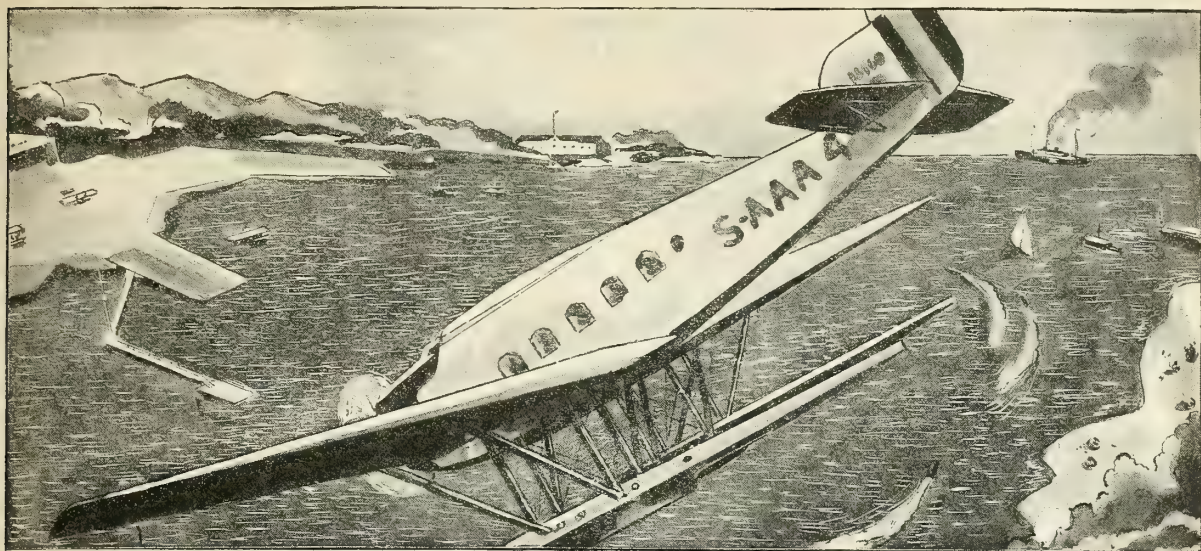
Another method of publicizing the show is the support advanced by the fifteen radio stations in the Los Angeles area. Collectively they are supplying more than 150 programs requiring a total of more than 100 hours. Within this time span, there will be many addresses by people directly connected with aviation. The first week of the radio campaign awakened the entire vicinity to the details of the aircraft show.

Cliff Henderson, as managing director, is using the results of all his previous experiences and already provides assurance of a genuine

(Continued on page 259)



Map showing location of building where the Western Aircraft Show will be held



# WINGS *that scintillate with color . .* CABINS *styled in modern luxury*

**T**ODAY, prime factors in the sale of planes are: color, beauty, comfort and convenience. *Styling* has become as essential to aircraft as to modern motor cars.

Pioneers in the development of aircraft finishes, the du Pont organization is uniquely equipped to render valuable assistance in the important work of aircraft styling. For every part of the ship, du Pont now supplies finishes especially de-

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Complete information on any du Pont product for airplane use will be furnished either by

mail or by a qualified representative.

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**Du Pont Dopes**—The du Pont line of aircraft finishing materials includes clear, semi-pigmented and pigmented dopes. They are all tested formulas of remarkable durability—proven in service as well as in the laboratory. Flexible and highly bluish-resistant, the Army and the Navy have approved these products for their requirements. Available in a wide variety of highly visible colors.

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# PERSONALITIES



by Caldwell

IN answer to a request from me for her thoughts on the women's derby, Amelia Earhart writes: "May I plead for a woman on the race committee next year? It is in no spirit of criticism that I suggest this innovation, but as a help to participants and committeemen. I think she should be there to point out, not differences in the way of treating men and women who enter races, but their similarities. I believe I express the opinion of most of the racers when I say they don't want to be pampered. I believe from observation that the women are capable of hard flying and do not ask quarter on predetermined rulings."

I'm right with you on this, Amelia; and although some of you are about ready to tear my hair out because of my kidding you here and there, why, I'm ready to go to the mat any time to fight for what I think are your rights. Yes, just as ready as I am to tell you where you're all hay-wire, like when you all breezed in to Cleveland dressed like Uncle Enoch's hired man. It's an ill wind that blows nobody good, though you should have seen how the trade in smoked glasses picked up after the female overalls brigade landed. And the Cleveland Clinic has been jammed with eye operations ever since. However —

The men in aviation, the men who run races and manufacture airplanes, are glad to sell airplanes to women and glad to have women compete in the races because they are good publicity—much better publicity, at this stage of the game, than are any of the men. The few women in the 1929 races received about five times as much publicity as all the men received; they were a good drawing card for the public, which pays the admissions that make these races possible. And the planes they flew appeared in more news pictures than any planes flown by men. Aviation is a business, and in aviation, at least so far as the races were concerned, the women brought in business. And they paid to get in the business, paid to learn to fly, paid for airplanes, paid their expenses; in other words, they were taxed to get into aviation just as a man is taxed to get in.

Now, taxation without representation is against every principle of American Government; taxation without representation is unfair and un-American, and should have no place in American aviation. Never mind what the other countries think about it—you know, a German or a Frenchman thinks a woman should stay home and do the cooking (and to tell you the truth I, as a married man, agree with the Frenchman, but I'm outvoted over here). "50,000 Frenchmen can't be wrong!" Perhaps they can't—in France. But they'd be all wet over here; they better stay in France where they're safe. If Pancho Barnes ever gets a good crack at a Frenchman — !

No, the women are taxed to support aviation, and therefore they should have a say about how their part of it should be run,

even though we face the danger of having them run our part as well. They'll get what they want anyhow—they always do—so we might as well be gentlemen about the matter and give in gracefully. It's an old American custom, giving in to the women, and there's no reason why we should try to make an exception to the rule in the case of aviation. So I'm leading the band-wagon in this matter of giving the girls a place on the race committee for next year—they're going to get it anyhow, so I may as well take credit for boosting the idea. Let them have their own representative on the committee, one who understands their problems and can speak for them. I suggest Mother Tusch or Floyd Logan.

BACK in the year 1911, A.D., in the old New York Model Aero Club, where such shining lights as Vincent Burnelli, Cecil Peoli, Ralph Barnaby, Jean Roché, and our own George McLaughlin got their start in aviation, there entered one day, unheralded and unknown, alike to fortune and to fame, a shy and shrinking youth, who clutched in his trembling hand a model bearing this odd placard: "It may fly, but I

doubt it." (His doubts, I believe, were soon at rest—it never did.) That youth, for whom no hands were playing, to whom Grover Whalen had never extended the hand of welcome—he's about the only one in America Grover hasn't welcomed—that youth, destined by Nature and an odd mental quirk to be the aerial exterminator of 876,-569,234 disgusted bull weevils in the chigger belt of America, was none other than George B. Post, now Vice President in charge of sales for the Edo Aircraft Corporation, of College Point, L. I., so named because there isn't a college within miles of it.

Even in those early days George Post had ambition. It developed to full flower in the building of a glider for man-carrying purposes; and the only thing wrong with it was that it wouldn't carry a man. So George, with the good of the family at heart, sent his kid brother aloft in the thing, which was equipped with a tricycle landing gear, that broke the full force of the fall. From then on George let the United States Navy do the building of aeronautical equipment on which he trained at Bay Shore and Pensacola during the war. He ended up a Division Commander and Chief Test Pilot on H boats and got to be a Lieutenant (J.G.). As soon as the Germans learned this, they gave up in despair and retreated to Berlin, while George, who had spent practically the whole war watching the pelicans picking up fish from Pensacola Bay, and the crash boat picking up students and pieces of N-9's from the same waters, dashed off to Bolling Field to do a little picking up himself. He assisted in the tests made for Godfrey Cabot, who had invented a system for "picking up burdens in flight." George watched this battle for a moment, then picked up his luggage and departed for Ogdensburg, N. Y., where, with Tom Huff and Elliot Daland, he became one of the incorporators of what is now the Keystone Aircraft Corporation of Bristol, Pa.

From 1921 to 1923 George struggled manfully with the early Huff-Daland types, as Chief Pilot. He was the brave lad who first leaped into the air with these creations to see if there was anything wrong with them. Then he was in charge of the company's Kansas City sales office. They sold just one plane in one year. That was 1923, the year I had the great pleasure of meeting George in a keen competition at Pensacola. There were three of us, George Post, the late Eddie Hubbard of Boeing, and myself, representing the sainted Glenn L. Martin, all sternly engaged in the noble work of trying to sell the United States Navy what I believed were the three worst training planes the ingenuity of man ever produced. I believed that until I saw what the Naval Aircraft Factory of Philadelphia brought along, when I instantly came to the conclusion that ours were pretty good. The Boeing of that date had a tendency to go into spins; the Martin had wings that moved

(Continued on next page)



Left to right: George B. Post, Sgt. McConnell and "Spoons" Boedecker at Brooks Field, 1923, with the Huff-Daland

# Some typical EDO Float Installations

All of these Ships have been licensed as EDO-Equipped Seaplanes



Ryan B-5  
Wright J-6 300 Motor



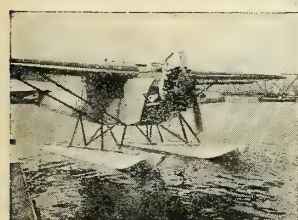
Travel Air Biplane  
Curtiss Motor



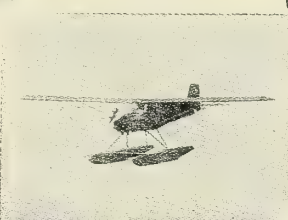
Command Air  
Werner Motor



Bellanca CH  
Wright J-6 300 Motor



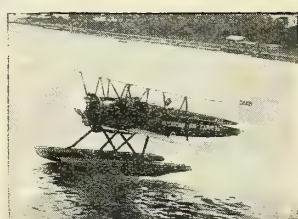
Fokker Universal  
Wright J-5 Motor



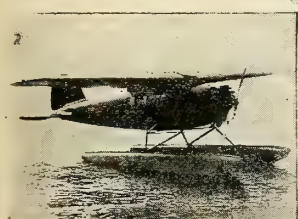
Curtiss Robin  
Challenger Motor



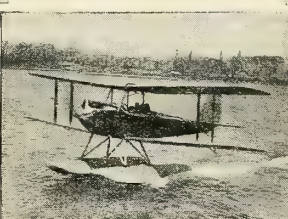
Waco-10  
Whirlwind Motor



Stearman C3-B  
Wright J-5 Motor



Lockheed Vega  
Wasp Motor



Moth  
Wright Gypsy Motor

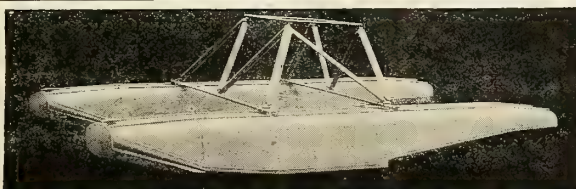


Travel Air Monoplane  
Wasp Motor



Buhl CA-6  
Wright J-6 300 Motor

Edo Standardized All-Metal Seaplane Floats are available in a complete series for all planes up to 5100 pounds, gross load.



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gently back and forth as the plane progressed through the air; and the Huff-Daland had a forest of struts connecting the floats to the fuselage that a mechanic couldn't even wriggle through. One tried it, and we had to cut him loose with a blow torch. The Naval Aircraft Factory exhibit would go only when pushed. That was the layout, and when I tell you that George Post managed to sell six of those creations of his, and that Glenn and I managed to foist off the one we had, while Hubbard sold 78, you will understand that we were all good salesmen, or else the Navy was easy. I guess the Navy was easy.

Heartened by this success, George flew with "Spoons" Boedecker to Brooks Field in that same plane, and by the grace of God arrived there intact. That was the first Whirlwind in those distant parts, and was called "Stuttering Sam" by Major Ralph Royce and the boys. For the next two years Post braved a nervous collapse organizing and trying to avoid disaster with the Huff-Daland Dusters, later managed by Harold Harris, who had just tested Henry Berliner's helicopter, and consequently was afraid of nothing after that. From the Dusters George, with the souls of 876,569,234 boll weevils on his conscience, went to a sanitarium, a natural step, and thence to selling Free Bottom Craft, a boat propelled by an air propeller, and "nothing on the bottom but paint." He was connected with Keystone until last year, when he joined Edo. The poor fellow can't seem to stay away from the water. He's even attached to the Naval Reserve Station at Rockaway, New York City's main defense against an invading enemy air fleet. If that fleet ever passes Fish Moebus, Bill Rogers, and George Post all will be lost. The only thing remaining will be to have Grover Whalen welcome it to New York. That should sink it.



SAY, folks, here's the biography of a real author that should brighten up this sad department—Louis Goldsmith, who says: "I had no idea that a common garden variety of pilot could get into 'PersonAIRli-ties' unless he had killed at least two Admirals and had maimed a third. I'm sending a quart under separate cover. My biography is a drab affair. I got the itch to fly while overseas. A fellow could lean back against the revetment of the trench and stir up the

cooties on the small of his back while gazing aloft at those lucky birds who had a dry place to sleep at night and a chance to change underwear once in a while. I had to quit school to get into the war, so I had to finish that before the Army would let me in as a cadet in 1920. Before I finished that training, I got the idea that I had all



Louis Goldsmith



Freddie Lund and "Tiny" Westfall

the qualifications of a great author. I could drink a whole quart, when I was feel-right, and still navigate back to the field." (You're right, Louis—those are the qualifications, added to the ability to write with a stub pen and look Greenwich-villagey. That's why I don't progress—I still look South Bend, Ind.)

But let the literary light proceed: "I went to college to learn to write—don't laugh—and during the summers and on week-ends I flew contraptions that they called airplanes, so that I could continue my schooling. Then I spent two years flying forest patrol in the summer time and collecting rejection slips in the winter. I'll bet I have as fine a collection as Cy Caldwell himself." (Correct, Louis, you have. I wish they'd print them on thinner paper, don't you?) "Then I sold a few yarns, went back East and got real chummy with a few editors, made connections with the best literary agent in the country and came back West to write my way to fame. I wasn't going to fly any more. I went out to the Seattle field to see a friend, Hers Laughlin, chief pilot for the West Coast Transport Co., and before I had finished looking over the cockpit of a trimotored Bach my dreams of literary fame had begun to pale. A couple of weeks later I went on the Portland-San Francisco run for the West Coast. I still write an occasional yarn about rip-rarin' skyriders. Some day I shall write the great American novel, and it'll reek with the smell of gasoline, the drone of motors overhead and the scream of speed-tortured flying wires—how's that? Yours for bigger and better navies and anti-aircraft armament. May they continue to furnish amusement to bored aviators."

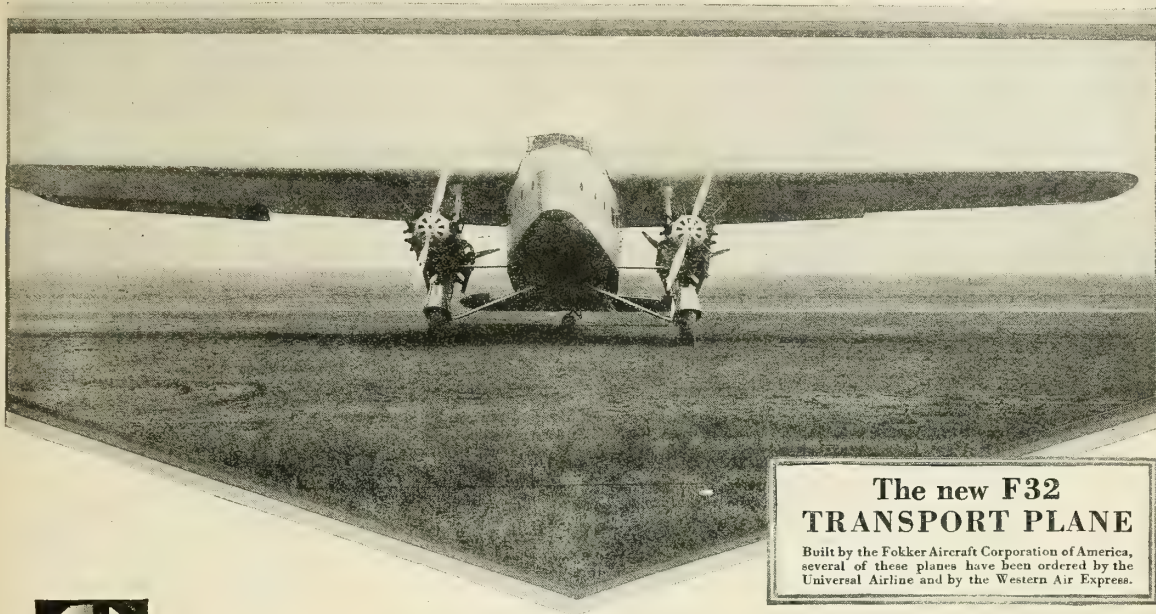
Best of luck on the great American novel, Louis. You're number 17 on the list of pilots who have confided the same ambition to me—and land knows how many waiters and cooks and chauffeurs are nursing the same laudable intention. But you might as well lay off, because I'm going to write the damn thing myself. I've been going to do it for three years, and already I have the title written down.

WHO is this, do you know? He was the first commercial pilot to make an outside loop in a commercial airplane—a Waco Taper-wing. He made the first change ever made from an airplane to an automobile, both vehicles making about 75 m.p.h. He is the holder of the record for changing planes in mid-air, accomplishing the change in one minute, 29 seconds at Long Beach, Cal. He made the first, and perhaps the only rescue made in mid-air. And he is, so far as I know, the only pilot ever to refuse a large purse that had been taken up for him to reward him for his bravery in making that rescue. Who is he?—Freddie Lund, now Chief Test Pilot of the Waco Aircraft Company and a great little guy.

What jolted Freddie out of the paths of respectability was the war to end war—and incidentally to start the Jenny on its way. In 1917 Freddie joined the Air Service, serving at Brooks and Kelly Fields in Texas, and in England, France and Germany for two and a half years. He was with the Fourth Pursuit Squadron on the Toul Sector. After the war he purchased an airplane and in 1920 flew at Mercury Field, Los Angeles, doing aerial acrobatics for the movies, and doubling for Tom Mix, Larry Semon, and other screen heroes. If you ever saw Larry Semon hanging by one hand from some part of an airplane, you were probably gazing at Freddie Lund. Larry would pose for the close-ups and Freddie for the high-ups—a fair division of the labor.

In 1923 he started a flying circus at El Paso, but because it proved too tame for him, he joined the Cuban (or was it Mexican?) revolution for a few months. Then he joined the Rocky Mountain Flying Circus for a time, started his own circus again, and later joined the Gates circus. He had a passion for circuses, having carried water for the elephants when a youth. It was in February, 1924, that Freddie made the only mid-air rescue I have heard of. (Correct me if I'm wrong.) Miss Rosalie Gordon, of Houston, made a parachute jump, and the ropes of her 'chute caught on the wires of the plane, leaving her dangling beneath the ship. Freddie, on the ground, saw the girl's predicament and knew that the pilot could not land without dragging her to her death. He grabbed another pilot and a ship. They took off, flew beside the other ship, to which Freddie changed. Then he climbed down on the undercarriage and pulled the girl up to safety. That was when he accepted a gold medal but turned down the purse with the remark that "it was all in the line of duty." It was a duty that few men could have performed.

In 1926 he bought a Waco and toured the country for twenty-two months, when he went to Cuba for eight months, flying for a newspaper, and returned to the States in 1928 to become Chief Pilot for Waco. He has flown in forty states of the union, but has recently got married to a very charming and beautiful young lady, so I imagine that his wanderings are over and that from now on he will do most of his flying around Troy, Ohio. And as to standing on his head on the stabilizer—well, just let Mrs. Lund catch him at it, that's all!



# The largest commercial transport plane - - *finished with Murphy Aircraft Finishes.*

We "point with pride"—and justifiable pride, you will agree—to the fact that the new F32 Transport Plane built by the Fokker Aircraft Corporation of America was finished with Murphy Aircraft Finishes.

We call particular attention to the use on the ply-wood wings, of Murphy Flexible Finishing Lacquer—the *clear* lacquer of unparalleled ability to withstand the destructive ultra-violet rays of the sun and to "flex" with the expansion and contraction of the wood.

We shall be glad to send our "Specification Manual for Aircraft" to those interested.

MURPHY VARNISH COMPANY, Newark, Chicago, San Francisco



## MURPHY AIRCRAFT FINISHES

*Famous for 64 years among architects, master painters, and makers of products requiring a fine finish*

Aircraft Spraying Lacquer Colored  
Aircraft Super Spar Varnish

"Z-1" Dural Primer Enamel  
Heat Resisting Aluminum Mixing

Aircraft Flexible Finishing Lacquer Clear  
Aircraft Non-Toxic Nitrate Dope





## PEGASUS, "THE FLYING HORSE"

**T**HIS month we are returning to model building by taking up the design and construction of a most unusual flying model. It is quite a step from the Yard-sticker sailplane, described in the September issue, to the "Pegasus," but since many of our readers have asked for plans of a more advanced type, here they are.

Pegasus, as you may know, was the flying horse of Greek mythology, and it may seem a strange name for a modern airplane, but here's how it all came about. Mr. Agnew E. Larsen, chief engineer of the Pitcairn Aircraft Corporation, when examining the model, exclaimed: "What's the idea of the four wheels? It stands up like a horse." That was enough to give the idea, and it was promptly christened "Pegasus—the flying horse."

Perhaps you have made some of the ultra light and fragile models which must be flown in a calm and have been disappointed in their limited possibilities. Models of this type have remarkable durations because of their light weight, but for every day, reliable performance, they cannot be called dependable. That's why we have Pegasus. With its high center of gravity, dihedral and swept back wing, its pusher propeller, and its rugged tubular fuselage, the Pegasus will fly into mean, gusty winds; climb to great heights, cover distances of a quarter mile, and fly day after day without a sign of breakage.

### HOW TO BUILD AND FLY THIS REMARKABLE MODEL

By R. E. Dowd

The design suggested itself from a study of Mr. Fokker's first airplane called "The Spider." It had the same wing form and center of gravity location, and its stability was so great that no ailerons, or lateral balancing devices were employed. With its great ungainly stick projecting out forward, the Pegasus is anything but a beauty, but once in the air, it flies with exceptional stability and grace.

That's the story of the Pegasus. Now let's build it. It is not very difficult. Just make up your mind to do a really fine job before you begin, and you will never regret building the Pegasus.

Here's what you need for materials:

1. 1/32 inch thick basswood for fuselage and ribs.
2. White pine for propeller blank and end plugs.
3. 3/32 inch by 1/4 inch white pine or basswood for wing spars.
4. Bamboo for wing tips and tail.
5. Sheet aluminum for wing spar joint and front fin.
6. Rubber strand for motor.

7. 1/16 inch diameter plane wire for propeller shaft and hooks.

8. Wire for trailing edge of plane and landing gear.

9. Dress snaps for wing mounting.

10. Wheels.

11. One release dog from an old alarm clock and 2 inches 3/32 O.D. brass tubing.

12. Rice paper and a small piece of silk.

13. Banana oil, Ambroid cement, soldering equipment and shellac.

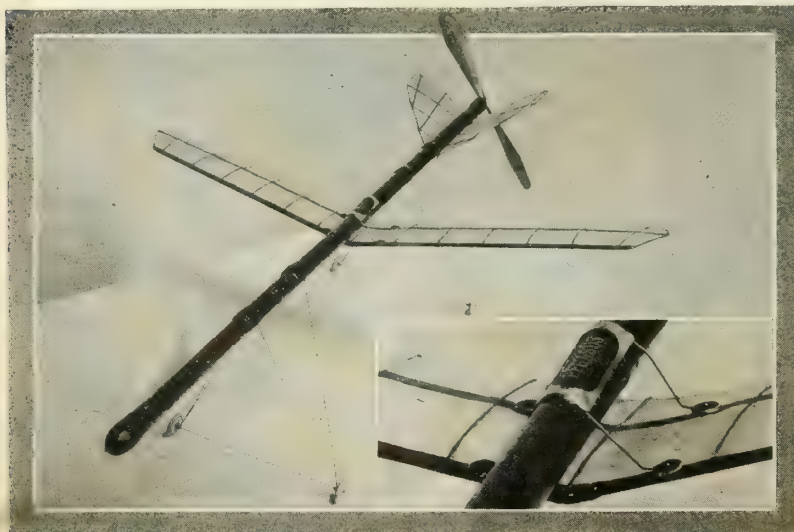
#### Build the Fuselage First

The fuselage is 36 inches long and is formed of 1/32 inch thick selected basswood. The sheet of wood is first reinforced by an application of rice paper "doped" on with banana oil. Before attempting to wrap the wood around the 3/4 inch diameter paraffined dowel, which is used as a form, you immerse it in fairly hot water. A few seconds of this immersion will soften the wood so that it can be easily formed. The surface to which the paper is doped is, of course, used as the inside, and the paper then becomes a reinforcing lining. The wood will be found to be so soft and pliable that it readily forms around the dowel. String or rubber strand will hold it to the shape of the dowel while drying.

When it is thoroughly dry, the wrapping is removed and the edges trimmed and beveled for cementing. Allow about 1/4 inch for overlap and then slip the shell over the paraffined dowel again, this time applying Ambroid to the lap joint and wrapping with rubber strand. Before the cement sets twist the tube about one turn by twisting the ends in opposite directions. This will avoid any distortion of the tube from the cemented joint. When thoroughly dry, the dowel can be easily removed by heating slightly, which will melt the paraffine. A final coat of rice paper doped on makes a three-ply fuselage of great strength and beauty.

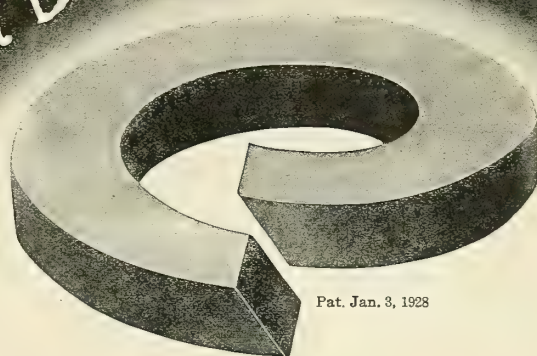
The front and rear ends of the fuselage are reinforced in exactly the same manner, so that a description of one will apply to the other. A white pine plug liner 1/4 inch thick is fitted snugly and glued to the inside of the tube. It has a 7/16 inch square hole in it to receive the streamline end plug, which is also of white pine. The outside reinforcing collar is 3/4 inch diameter tapering to nothing in a length of one inch. It can be easily made from an extra piece of the fuselage material cut off before cementing the tube seam. It fits the tube snugly

(Continued on next page)



"Pegasus" ready to fly. The inset shows how the wing is attached to the fuselage

PAY MORE  
and Get Better Value



Pat. Jan. 3, 1928

WE do not hesitate to tell you that Kantlinks cost more than plain coil lock washers.

They cost more to make. But they do not tangle or interlink—and in the long run they are more economical to use. They neither rust nor deteriorate rapidly.

industries have tested and adopted Kantlinks. Some plane and engine manufacturers, seeking the best, have done so, and we urge you to order a trial lot of Kantlinks for your own tests.

Prices and full information will be sent by any one of the manufacturers listed below.

Made and sold under license  
by the Kantlink Manufacturers:

The American Nut & Bolt Fastener Co.  
Pittsburgh, Pennsylvania

Beall Tool Co.  
East Alton, Ill.

The Mansfield Lock Washer Co.  
Mansfield, Ohio

The National Lock Washer Co.  
Newark, N.J., Milwaukee, Wis.

The Positive Lock Washer Co.  
Newark, New Jersey

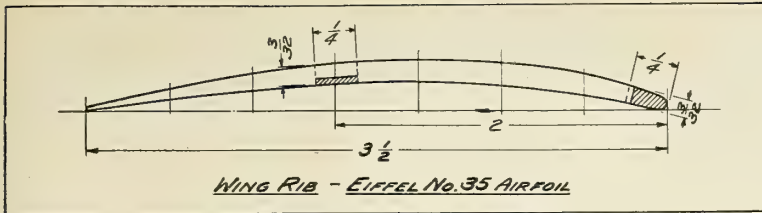
The Reliance Manufacturing Co.  
Massillon, Ohio

3095

**KANTLINK** SPRING LOCK WASHERS  
TRADE MARK DO NOT TANGLE DO NOT RUST  
THEY PAY THEIR ENTIRE COST IN TIME SAVED - SOMETIMES EVEN MORE







model enjoys, once its name becomes known among the junior "fans," is certainly surprising and well repays the builder for the small amount of additional work required to add this feature.

The wire struts are made of .032 steel wire. They are soldered to the tin mounting plate and their ends are bent after annealing so that they form loops or eyes into which the dress snaps are soldered. By bending the wire struts, the angle of incidence may be changed. It will be found that an incidence of 4 degrees, however, will give the best results. The covering is Japanese rice paper except the top surface of the two center panels, which is silk to prevent puncturing. Both the paper and the silk are doped with banana oil.

## Now the Stabilizer

The stabilizer frame is constructed entirely of bamboo. The ribs, both lateral and longitudinal, are  $1/32$  inch thick by  $1/16$  inch wide. The outline is  $1/32$  inch square and is formed to the required shape over a flame. On the original model this outline was a single piece, but because of the difficulty of making the reverse bend in the "V" of the tail, it is advisable to make it in two pieces. The frame is built with an unusually large dihedral angle which avoids the necessity of a rear fin and improves longitudinal stability. Double surfacing of doped Japanese rice paper is used as a covering. The finished stabilizer is fastened to the fuselage by lashing with thread.

## The Fin Is Next

A fin made from .010 thick sheet aluminum is provided on the nose of the model. The attachment of a sheet metal fin to the fuselage of a model is an item of construction that has given model builders much trouble. Because of the simplicity and success of the method used on the Pegasus, it seems advisable to describe it in detail.

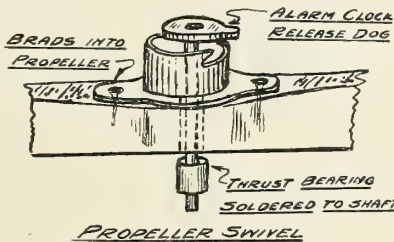
The fin, after being cut to size, is stamped on its lower edge by a row of small depressions made by a center punch against a hard wood block. Successive depressions are made from opposite sides of the fin in order to preserve its symmetry. A 1/16 inch by 1/4 inch basswood mounting strip is slotted and recessed on its under-side to receive the fin which is inserted from the bottom. The unit, fin and mounting strip, is assembled onto the fuselage. Cement is used liberally so that it fills in around the depressions and unites the whole into a firm, reliable mounting. The rear edge of the fin may be bent to steer the model. This method of steering will be found very effective because of the great distance between the center of gravity and the fin.

## Now Make the Landing Gear

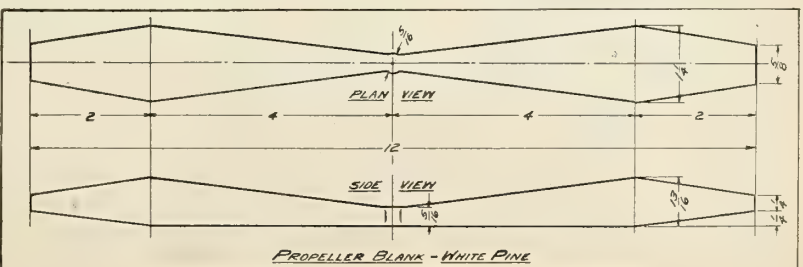
The undercarriage of this model is made up of two units that are identical except for the length of the wire struts. These struts are made of .030 steel music wire. Each set is made of a single piece of wire joined by a soldered lap joint. This joint occurs under the streamline caps, which are simply pieces of the fuselage tube after cutting to length. These caps are fitted snugly over the struts and are cemented and lashed to the fuselage. A through axle of the same diameter as the struts mounts the one-inch diameter celluloid wheels. The axle is wrapped with fine wire and soldered into the apex of the V struts. Small aluminum washers on either side of the wheel and a bent up axle end are all that is necessary to complete the undercarriage.

## Carving the Propeller Is Next

Although in outline the propeller resembles closely the historic Lang propeller, it is



really radically different. Its pitch is not uniform but reduces from the point of maximum blade width to the hub. This condition is caused by the rather unusual reduction in blank thickness near the hub. See drawing of blank. The carving is simple and easily done. The finished propeller is extremely neat and is among the most efficient I have ever tested. The blank is of white pine, and the whole propeller is covered with Japanese rice paper, which is doped on after carving and sanding. Though not absolutely necessary, a swivel attachment of the propeller will greatly increase the length of flights by prolonging the glide. The release dog from an alarm clock can





# AIRPORT AND AIRWAY

*News of airlines, airports, and airways; radio, lighting and other auxiliary services*

## Canadian Colonial's Operation

I WAS pleased last month by the arrival of a letter from Ralph Dodson, dean of international mail pilots, who had been reading this section in his odd moments in company with his brother pilots, John Deater and Jimmy Peyton, and who calls to our attention the achievements of their company.

He writes—"Canadian Colonial, in addition to being one of the most successful international mail lines of the world, is no mean passenger carrier. We have so many passengers we have to decline applications for seats frequently, because the mail is so heavy that we cannot allow passengers to occupy the valuable space. We have opened a new terminal at Albany with appropriate ceremonies and will occupy a similar one at Newark very soon, as well as a new hangar at the Canadian government field at Montreal."

"Ripples of discontent never mar the surface of our smooth operation," went on the border-hopping Dodson. "The division superintendents never question the decisions of the pilots, who, in turn, exhibit the utmost confidence in the mechanics and hangar crews. The mail goes on day after day with no interruption. We have not had an engine failure in the last thirteen months. For two recent months we have operated at 100 per cent schedule efficiency. John Deater, Jimmy Peyton and I read this section every month and we think these statements are deserving of mention. We would like you to fly over the line and see how the system operates."

If there was any airline in the world wherein "ripples of discontent never marred the surface of smooth operation," I had yet to learn of it. So I took a trip over the line to see for myself.

I have seen more "ripples of discontent" at a church supper than I saw on that line all the way from Newark to Montreal. Everybody seemed to know just what he was expected to do, and did it. At Albany, the hangar crew took charge and went over the ship like a troupe of pyramiding acrobats: never a lost motion or an unnecessary sound. There is none of the feverish excitement which characterizes the arrival and departure of many transport ships of the country.

By

Kent Sagendorph

There is a situation at Albany, however, which is going to cause the Canadian Colonial officials a good deal of embarrassment ultimately. The seven-place ships leaving New York for the northbound journey are usually well filled with mail. Two or three passengers are stowed away in odd corners. Upon arrival at Albany there is more mail to be taken aboard. If there is not enough room for both passengers and mail, the passengers have to get out and walk; meaning they continue on to Montreal by train.

This situation cannot prevail indefinitely, for obvious reasons. Eventually, perhaps, the company will segregate the traffic and carry mail in mail ships and passengers in passenger ships. When this time comes, passengers will no longer be forced to arise at 5 a. m. in New York City in order to catch the 8:00 a. m. departure of the plane from Newark Airport. The growth of the mail poundage has been rapid and steady, and soon the patient Fairchilds will be outgrown entirely, leaving them to handle the expanding passenger traffic.

The scenery and natural beauty to be observed throughout the trip is unsurpassed anywhere in the East. First, the Palisades and the majesty of the broad Hudson River—then the lake country; Saratoga, Lake George and Lake Champlain, and finally the St. Lawrence. Mountains, farms, quaint provincial towns and expensive estates all have a special appeal for the traveler. Dodson, who has made this trip hundreds of times, finds something new to admire on each journey.

The new terminal at Albany is provided with a weather office, ticket and information bureaus, offices for the division superintendent and his staff and large and spacious quarters for the blue Fairchilds. The waiting room contains deep-cushioned lounges, attractive wicker chairs, shaded lights and a radio set.

The main explanation of lack of editorial space devoted to this organization is that

it functions so smoothly that nothing ever happens to get it in the papers.

## Roof Marking Campaign Shows Progress

FOR the last year, the Guggenheim Fund for the Promotion of Aeronautics and the Department of Commerce have bent their efforts toward securing local coöperation from towns and cities along the air routes of the country in the matter of obtaining roof signs to aid fliers. Many cities and towns now carry prominent signs on large roofs giving the town name and a meridian indicator; often there is another arrow pointing toward the local airport with the distance given in miles. Although the air-marking program is yet far from complete, every month there is an increase in the number of towns thus identified, and a corresponding decrease in the number of lost pilots who fly low over towns in order to read the sign on the railroad station or on somebody's garage.

This month we take pleasure in presenting five additions to the list; all located in valuable positions on well-traveled airlines. Because the pilots may read these signs from altitudes of several thousand feet there is no further necessity to roar down across the housetops looking for some shopkeeper's sign. Townfolk, no longer hearing or seeing the airplanes, believe that the sign is not being read by fliers. Such markers, however, are read every day; often several times a day. And every time the pilot passes over the town, he mentally thanks the community for thus helping him. With the growth of air traffic and the increase in the number of private owner-fliers, these signs will become more and more important in building up good-will for the community. The signs cost very little, and repay their investment scores of times in advertising the progressive and coöperative spirit of the municipality.

The five markers which we announce for the first time are as follows:

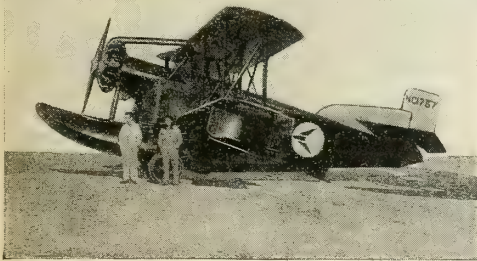
Corinth, N. Y. Situated just above Saratoga on the wide bend of the Hudson River. Town name in ten-foot orange letters on a black roof of community house adjoining plant of the International Paper Company. Meridian indicator directly below. Mayor

(Continued on next page)



Hangar and administration building on the new airport of the Standard Airlines, Inc., at El Paso, Texas

# KEYSTONE-LOENING AMPHIBIAN "AIR YACHT"



Large view—The New York & Suburban Airlines fleet of four Keystone-Loening Air Yachts at the North Beach Airport of New York Air Terminals, Inc. Small view—One of the fleet.

## 3 HOURS PER DAY PER SHIP—AT A PROFIT

The suitability of Keystone-Loening Air Yachts for profitable charter service has been clearly established in the operations of the New York & Suburban Airlines. Under the direction of Captain Harry Rogers, authority on marine flying, flights have been conducted with a fleet of four Cyclone-powered Air Yachts from the base of the N. Y. A. T. Airport at North Beach, New York City.

Trips to Maine, the upper St. Lawrence and other distant points were made regularly, supplemented by "beach hopping" at lake and shore resorts. The average time in the air—3 hours per ship per day—was 50% in excess of the quota originally set. Earnings averaged \$90 per hour per ship, including all non-remunerative flying, while special work often brought as high as \$400 per hour. During one 60-day period the four Air Yachts earned \$65,000.

The management of the line has especially noted—(1) the decided preference of their patrons for amphibians over land or sea planes, (2) the outspoken delight of the passengers in the comforts and smooth flight of the Air Yacht, (3) the easy handling of Keystone-Loening Air Yachts by the beach crews, (4) the advantage of having only one engine per ship to service during busy days, (5) the low operating and maintenance cost.

This is another striking example of how Keystone-Loening Air Yachts assist the transport operator to success.

6 to 8 passengers : 525 H. P. : 100 M. P. H. Cruising : \$27,900



## KEYSTONE AIRCRAFT CORPORATION

SALES DEPT.—31ST STREET AND EAST RIVER, NEW YORK  
PLANTS—BRISTOL, PENNSYLVANIA, AND NEW YORK CITY





Atlantic Coast Airways plane, operating between New York and Atlantic City

(Continued from preceding page)

George Melville extends cordial welcome to all pilots who land either at Saratoga or Lake George.

Bridgeport, Conn. Large sign on roof of Bullard Machine Tool Company, located on the N. Y., N. H. & H. R. R., five miles from the Bridgeport airport. This sign is directly on the Boston-New York airway and in full view of all mail planes, passenger liners and privately operated aircraft.

Fort Wayne, Ind. This marking reads: "Bowser-Fort Wayne," furnished by the S. F. Bowser Company, manufacturers of Bowser fueling pumps, and painted on roof of company's main office in orange letters ten feet high. Directional arrow points to Paul Baer Municipal Airport and the Sweetbrook Airport, located eight miles N.N.W. from the sign.

Norwood, Mass. Town name painted on roof of Bird & Sons plant, with meridian indicator adjacent. Letters fifteen feet high cut from strips of this firm's roofing, cemented to slate roof of plant, painted with aluminum paint on black background. This system recommended by Guggenheim Fund and acknowledged by certificate.

Marysville, Kansas. One of the largest aviation roof signs in the world—fifty feet high and 600 feet long. Constructed on roof of stockyards pavilion. Town name supplemented by meridian indicator. Can be read easily from 5,000 feet.

#### Plea for Wider Use of Radio

EVERY month new aids for the cross-country flier come into being in the form of augmented radio service, weather reports, airway information and directional beacons, as well as simpler and less costly airplane radio equipment. Great transport lines recognize the necessity for providing radio communication, and mail planes depend upon the information thus furnished when weather conditions are next to impossible for flying. But in addition to the absolute need for radio in commercial flying, there remains the advantage of radio for the private flier. Short-wave stations are now in operation all over the country to provide him with information concerning local conditions at distant airports or along airlines he proposes to utilize. Time signals and radio-beacon service are available to the independent operator and private owner as well as the million-dollar transport line. The Federal Radio Commission has re-

cently directed all stations which hold licenses for aircraft service to render this service without discrimination to all aircraft which use the airways. The T.A.T. has already announced some time ago that its huge network of stations is now supplying information, not only to T.A.T. planes, but also to anybody who happens to fly on the airway at the time the signals are going out.

If the smaller operators and individual fliers who fly on radio-equipped airways were to provide themselves with suitable reception equipment, they would have the same protection enjoyed by the multi-motored passenger liners and mail ships. Investigation and inquiry reveals that a great many pilots do not overlook radio because of the expense of the sets or the technical nature of the equipment, but because they don't like the appearance of the six-foot mast which is now required for most types of airplane radio apparatus. The mast costs the makers of radio equipment many thousands of dollars annually, because, if it were eliminated, there would be about five times as many airplanes carrying radio equipment as are now carrying it. A prejudice, when once established, is very difficult to overcome.

The mast will probably be eliminated in the near future by the manufacturers of sets, but certainly there will be no return to the trailing wire antenna. Nevertheless, the attention of all pilots and owners is invited to the advantages of radio protection. The mast is relatively unimportant when the value of the vital information thus lost to the pilot is considered.

### AIRPORT AND AIRWAY DEVELOPMENTS

#### Department Publishes List of Airports

THE Aeronautics Branch, Department of Commerce, has completed the preparation of a revised list of recognized airports and landing fields in the United States, published under the title of Aeronautics Bulletin No. 5. The list includes only such airports and fields as possess some sort of facilities for the service and storage of aircraft, or which have been marked and reserved as landing fields without facilities.

Following the list is a supplement devoted to proposed airports which are not yet in service.

The Department is making every effort to

obtain full information on all new airports and fields which are being established in the country. In order to keep this bulletin and its successors up to date at all times, it is strongly recommended that sponsors of every new airport communicate with the Division of Airports and Aeronautical Information, Department of Commerce, Washington, D. C. Special forms will be sent upon request for full information concerning the new port, on receipt of which the Department will publish a bulletin covering it which will be distributed throughout the industry. If the airport has already been bulletinized, any changes, additions and reconstructions should be reported.

In addition to the list of airports contained in Bulletin No. 5, there are about 4,000 other fields in the United States on which aircraft can land or have landed. Many have not been reported; others have changed character and been sub-divided into building lots or planted with alfalfa, hence they are of no value as a permanent record. The current bulletin represents a condensed summary of recorded airports and fields now in existence, and should include every new airport in the country as soon as it becomes available.

#### New Airports Dedicated

THE following is a list of airports recently opened in various sections of the country:

**New York Seaplane Airport:** Port Washington, L. I. Operated by the American Aeronautical Corporation, builders and distributors of Savoia-Marchetti twin-hulled seaplanes. Dedicated with much pomp and ceremony September 14th, and visited by prominent figures in the world of aviation. No details of the port or its facilities are available.

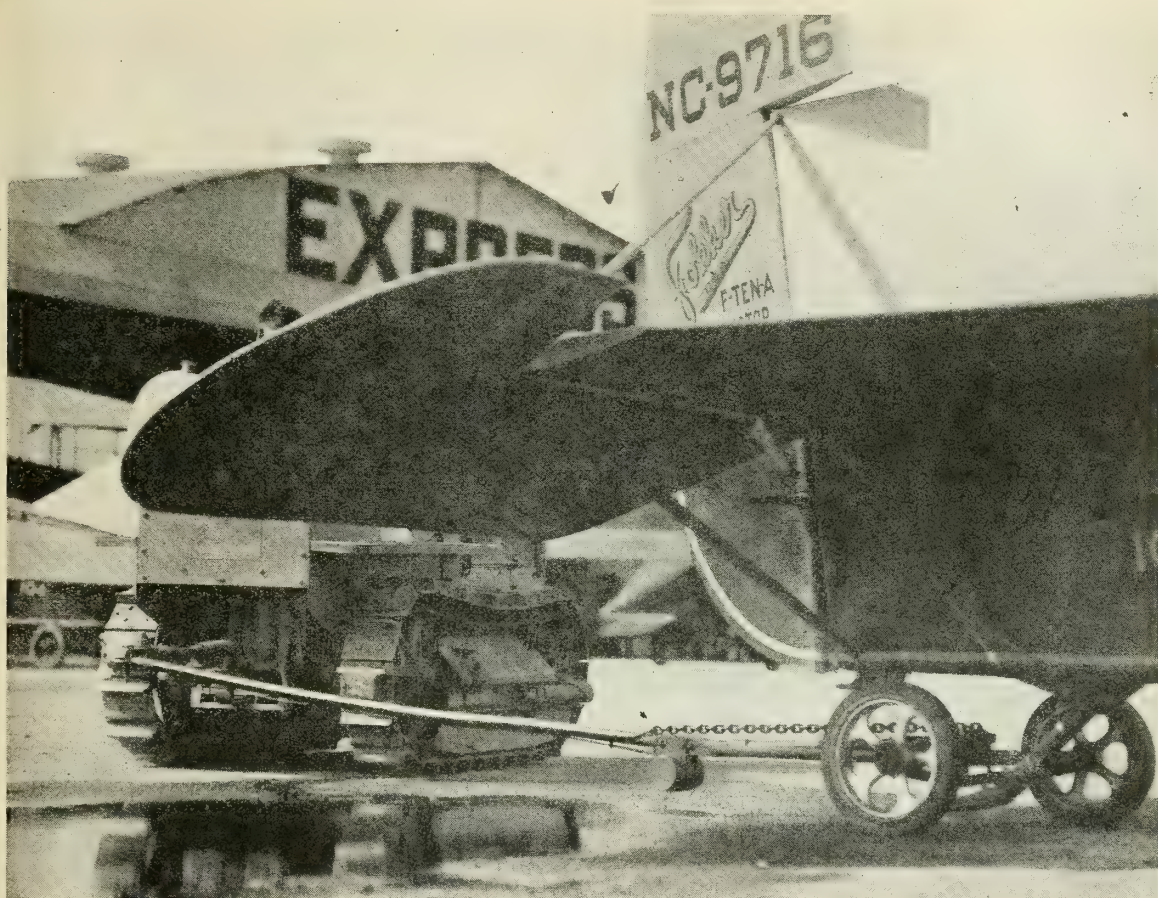
**Montgomery, Alabama:** Municipal airport. 1,000 acres, with 600 acres available on the field proper, the balance being under construction. This field was built to be an A-1-A port, with floodlights, beacon, boundary, obstruction and ceiling lights all operated from a central panel in the operations office. Brick and steel hangar 150 by 150 feet. Clubhouse, dormitory and dining room. Three-story administration building. Automobile service station. Complete repair and service shops for aircraft. The field is located three and a half miles from the city on a concrete highway, with a railroad adjoining the property on the south.

Licensed mechanics are available for engine repair and adjustments, welding, major and minor overhauls of aircraft. Hotel for visiting pilots and clubhouse with dance floor add to the attractions of the field. Activities include: Montgomery School of Aeronautics, Southern Air Express Terminal passenger line to Atlanta, taxi and charter service operated by the Montgomery School of Aeronautics. All facilities in operation and all buildings occupied. L. G. Mason, manager.

**Waterman, Illinois:** De Kalb County Airport. Located ten miles south of De Kalb, Ill., on concrete road. Sixty-five acres, beacons, ceiling, floodlights and

(Continued on next page)





# Handling the Big Birds

AFTER an airport has acquired a "Caterpillar" Tractor; after the first big jobs of leveling and draining have been licked—then a score of chores turn up where the same tractor serves handily and cheaply. It keeps the field smooth with drag or grader; it pulls the big planes into the hangars or spots them for refueling.

This "Caterpillar" Ten, with a special spring hitch developed at the Los Angeles terminal of the Western Air Express, pulls the biggest birds without ruffling their wings or tail feathers!

*Prices—f. o. b. Peoria, Illinois*

TEN . . . .	\$1125	TWENTY . .	\$1975
FIFTEEN . .	\$1500	THIRTY . .	\$2475
SIXTY . . .	\$4300		

## Caterpillar Tractor Co.

PEORIA, ILLINOIS and SAN LEANDRO, CALIF., U. S. A.

Track-type Tractors      Combines      Road Machinery

(There is a "Caterpillar" Dealer Near You)

*Ask for the book on "Caterpillars" and Airports*

**CATERPILLAR**  
REG. U. S.      PAT. OFF.  
**T R A C T O R**





Combination aircraft and automobile gasoline service station opened recently at Los Angeles Metropolitan Airport

(Continued from preceding page)

boundary lights. 2,000-foot runways east to west and north to south and runway northwest to southeast 2,200 feet. Government weather station located there. One hangar, with fuel, oil and service facilities. Administration building. Activities: port of call for Boeing and N.A.T.

**Utica, New York:** New field located six miles northwest of Utica on mail highway to Rome, N. Y. One hundred acres now available, to be increased to 350 acres. Runways in five directions, varying from 2,700 to 5,000 feet. Beacon, floodlights, boundary and ceiling lights. Twenty-ship hangar. Direction arrows on buildings in Utica point toward the airport.

**York, Nebraska:** An airport was recently dedicated there, but no details are known.

#### Gross Ile Airport Plans Extension

**E. S. EVANS**, president of the Detroit Aircraft Corporation, which operates the Gross Ile Airport, Detroit, Mich., announced recently that plans have been made for wide extension of the facilities and service of the field. Seaplane hangars and service stations will be built, the channel deepened and docking facilities added. The unique system of runway lights developed by Airport Lighting, Inc., and described elsewhere in this section, has been nearly installed and will complete the facilities for flying boats as well as amphibians and land-planes.

The new runways will be completed before the end of the year, asserts Mr. Evans, and the leveling and grading will also be completed before that time. The Detroit unit of the Curtiss Flying Service is already instructing students at this airport, which, when completed, will represent an investment of \$1,300,000.

#### Boeing Inaugurates Trimotor Service

**BOEING AIR TRANSPORT** has started preliminary operations on its day-and-night schedule from Chicago to the West Coast, involving the new Boeing 18-passenger transports. The route includes 1,943 miles of arduous flying over deserts, mountains, canyons and prairies, and constitutes the longest regularly-operated airline on the North American continent. It requires an elaborate system of bases, erection of many new hangars large enough to accommodate the huge 80-foot wings of the new ships, and extensive terminal facilities at fourteen cities. The line, which

will not be in operation until next spring, is the first all-plane, day-and-night passenger transport service between Chicago and the coast. The first seven ships have been completed and are now being flown over the line by the pilots who are to operate them after the line is in regular operation.

The schedule calls for departure from San Francisco at night and from Chicago in the morning. Two planes will be required for each transcontinental trip in each direction, the transfer point being at Cheyenne. The running time is twenty hours from terminal to terminal, including the transfer.

#### Wins Pennant in Airport League

**THE** baseball club of Universal Aviation Corporation at Lambert-St. Louis Field was the winner of the pennant in the Airport League, composed of several air transport companies on the field. The season was in two parts, with Universal losing three games in the first half, and winning every game in the latter period. The Universal company officials donated a silver baseball to each player on the team. Uniforms were purchased from the proceeds of a dance given recently by the employees, which was attended by 100 couples.

#### Legion Sponsors Panama Airport

**THE** Department of Panama, American Legion, adopted a resolution at its recent meeting favoring the establishment of a purely commercial airport in the Canal Zone, to be located on the Pacific side in the vicinity of Balboa, and operated as a Canal utility. Data presented in support of the resolution affirmed that the Canal Zone is the logical center of operations for commercial air traffic between South America and Central and North America; that aeronautical activities now in progress in the Zone demonstrate the need for a commercial airport beyond question, and that there should be no connection between the proposed airport and any scheme of military or naval policy to be adopted in the future.

#### Radio Commission Reserves Frequencies for Aviation

**THE** Federal Radio Commission announced in Washington recently that a plan for straightening out the present tangle in radio-network circles had been adopted by that body, and that all licenses held by radio-communications stations were to be governed by the new agreement. Heretofore, licenses

have been granted temporarily pending adoption of such a policy, and henceforth all new stations must be governed by its conditions.

Briefly, the commission reserved certain frequencies for aircraft communications stations in addition to the ones now used; it ordered all stations to give service to all aircraft indiscriminately, and assigned definite wave-lengths to stations belonging to the transport companies now in operation.

#### New Airline in Yukon Territory

**THE** Yukon Airways and Exploration Company, of Whitehorse, Yukon Territory, has started a new mail, passenger and light freight line between Telegraph Creek, McKenzie River and Whitehorse, using two Ryan Broughams. For six months in the year, these Ryans furnish nearly the only means of transportation and communication with the outside world available to these towns. At times the planes operate in temperatures of between 40 and 60 degrees below zero.

#### Big Parade Booms Airport in Meridian, Mississippi

**A** GRAPHIC newspaper description of the activity surrounding the municipal vote on an airport in Meridian, Miss., was forwarded by our friend, Mr. J. C. Long, of that enterprising city. According to the newspaper account, Meridian went air-mad for the day, and the whole town turned out to cast its ballots for and against the project.

The big *Question Mark* flew over the city, accompanied by three Douglas planes, while below, a parade approximately five blocks long wended its way grandly along the streets of the business district. Led by the local Shrine band was a procession of glittering automobiles and shouting foot-marchers.

The bond issue carried by a majority of 57 votes, 7 over the necessary two-thirds. The airport, therefore, will be constructed immediately.

#### New Airport Bulletins Published by the Department of Commerce

**F**OLLOWING is a list of recently compiled or revised Airway Bulletins which are now on the press and which will be ready for distribution in about 30 days:

749 .....	Wanship, Utah
750 .....	Washington, D. C.
751 .....	Wabash, Ind.

(Continued on next page)



## ANNOUNCING THE INTERNATIONAL AIRCRAFT EXPOSITION

ST. LOUIS « » FEBRUARY 15th to 23rd

**S**T. LOUIS, the Natural Center of Aviation, has been logically chosen by the Aeronautical Chamber of Commerce, out of all the cities of America, for the one nationally-sponsored Aircraft Exposition of 1930. Here, where Aviation has so many advantages for manufacture, utility, and distribution, will be held the greatest Aeronautical World's Fair ever conceived or undertaken.

Staged in a vast, new Arena, in the world's largest show building, whose unobstructed center hall alone contains more than 131,000 square feet, and whose vaulted roof spreads 136 feet overhead, practically everything known to Aviation today will be exhibited. The best products of Europe and America, the newest designs, the latest developments of science and manufacture will here be assembled for all to see.

Twenty-one thousand spectators can be seated in this huge Arena. Opening out to east and west of this main structure are the "A" and "B" exhibit buildings, each 300 feet long by 288 feet wide. These, too, will be filled from end to end with interesting and instructive exhibits pertaining to every phase and branch of Aviation.

So tremendous is the space here available that planes landing on the adjoining field can be wheeled directly to their allotted spaces on the floors of the exhibit buildings without dismantling.

The Arena is located on a main boulevard—twenty-four minutes street-car ride from Union Station—opposite the famous Forest Park. Cars and busses pass the main gateway. Ample parking space for thousands of automobiles. Switch tracks adjoin the grounds.

Manufacturers throughout the civilized world have been invited to be represented here. Plans and arrangements for the Exposition and its details are now going forward on a scale never before attempted.

If you are interested in the manufacture of planes, engines, or accessories you are urged not only to exhibit, but personally to be present at this most important event of the year. If you are a financier or stock-holder, here is the opportunity to judge values. If you are a pilot or student, here is your world.

St. Louis is conveniently reached from everywhere. Centrally located; good roads; nearby landing fields; 29 railroads; excellent hotels; unlimited accommodations;

# ST. LOUIS

*The NATURAL Center of Aviation*

one of the most interesting and attractive cities in all America. Plan to meet the world of Aviation here in St. Louis on February 15th next!

THE INDUSTRIAL BUREAU of the INDUSTRIAL CLUB of ST. LOUIS  
Dept. A-3, 511 Locust Street « » St. Louis, Mo.

*Detailed information relative to the International Aircraft Exposition can be had by addressing Aeronautical Chamber of Commerce, 10 E. 40th St., New York City*



(Continued from preceding page)

752	.....Somerset, Pa.
753	.....Butte, Mont.
754	.....Crewe, Va.
755	.....Rochester, N. Y.
756	.....Chicago, Ill.
757	.....Pine Bluffs, Wyo.
758	.....Gothenburg, Nebr.
759	.....Peoria, Ill.
760	.....Dix, Nebr.
761	.....Chappell, Nebr.
762	.....Sidney, Nebr.
763	.....Melbourne, Fla.
764	.....Groversville, N. Y.
765	.....Knight, Wyo.
26	.....Marysville, Mich. (revised)
125	.....Pueblo, Colo. (revised)
132	.....Detroit (Dearborn), Mich. (revised)
138	.....Indianapolis, Ind. (revised)

## NEW COMPANIES—MERGERS STATEMENTS

### Transportation Division Established by the Aviation Corporation

**I**N order to consolidate all the transportation activities of the various subsidiaries of the Aviation Corporation, Graham B. Grosvenor, president, has created a Transportation Division, under which all such activities will be carried on. The head of the newly-created division is Tom Hardin, one-time Texas cowboy, former mail pilot and lately vice president and general manager of Southern Air Transport, Inc., an Aviation Corporation subsidiary. Mr. Robert J. Smith, former general traffic manager for Southern Air Transport, will act as assistant to Mr. Hardin in the venture.

The division will centralize control of all transportation matters, create a uniformity of practice, coordinate schedules, select and assign equipment and establish through rates for passengers on two or more airlines. Among the companies whose activities will be affected are: Universal Avia-

tion Corporation, Colonial Air Transport, Canadian Colonial Airways, Colonial Western Airways, Embry-Riddle Aviation Corporation, Interstate Airlines and Southern Air Transport.

## THE PASSENGER LINES

### Atlantic Coast Airways Adds Express Service

**A**IR express facilities have been added to the diverse activities of Atlantic Coast Airways, Inc., operating a fleet of Navy-built twin-motored seaplanes piloted by Navy officers on leave. The company's line from New York to Atlantic City will be utilized in the transportation of aerial express, as well as passengers, on a schedule of five trips a day, except Sunday, in both directions.

Special messengers call for the package and deliver it at the other end. Weight limit is 200 pounds, length and girth combined not to exceed 144 inches; length alone not to exceed 106 inches, and value not more than \$5,000. The company asks that shippers refrain from asking transportation for explosives or highly inflammable material; otherwise there are no restrictions. Motion picture films are accepted. The per pound rate is 60 cents, for packages up to 200 cubic inches. At New York, connection is made with lines operated coast-to-coast by the air express service of the Railway Express Agency.

Atlantic Coast Airways, in addition to the express service, recently inaugurated a special golf club service for members of the Sampawam Golf Club, Babylon, L. I. Several members taxied to the Battery from their Wall Street offices and embarked on a tug for the plane, anchored off Ellis Island. The ride to the club landing occupied 30 minutes, as compared with the train time of an hour and a half to Babylon in addition to the time required to reach the

club. Officials of the club assert the service is entirely practical and that it will be continued.

The passenger line operated by the company between New York and Atlantic City carried 194 passengers between August 21st and September 10th. Forty-two trips were made during this period; a total of 4,010 miles flown at an average speed of 70 miles per hour.

### Stationery Bill Irks Colonial

**"W**E are three miles up. Oxygen is getting scarce. Notify the newspapers and give my love to all." No, this is not taken from the log of an altitude hop, but from a letter written by a woman passenger on a Colonial Air Transport Ford en route from New York to Boston. There is an altimeter in the cabin which indicated 3,000 feet, and she probably misread it and believed that she was in danger of passing out from lack of oxygen.

This woman wrote 14 letters on this one trip. A survey was undertaken to determine the letter-writing proclivities of the passengers on this line, and it was discovered that the average was two letters and three postal cards per passenger per trip. In six months more than 6,000 sheets of notepaper and 9,000 postal cards have been used. In addition more than 1,500 sheets of paper have been carried away as souvenirs, as well as all the expensive writing portfolios the company has been able to furnish. Passengers have been known to write constantly from the time the plane took off until landing without raising their eyes to view the scenery which is such a feature of this journey. Most of these voluminous correspondents are women. Young men write a post-card occasionally, but older men do little writing while in the air.

### T.A.T. Passengers Enjoy Movies

**P**ASSENGERS on the westbound T. A. T. planes a few days ago whiled away the hours on the first stage of their westward journey to the coast with a showing of the current newsreel and two cartoon comedies, which consumed a total of 45 minutes in the showing. The diminutive apparatus used for projection, together with its batteries, weighs less than 34 pounds and was installed by the operator in a little less than two minutes. The screen was hung directly back of the pilot's cabin door on the front wall of the passenger compartment.

### Western Air Express Carries Children Half Fare

**A**CCORDING to an announcement by C. W. H. Smith, general traffic manager of Western Air Express, the problem of transporting children over the line has been settled. Parents do not feel that the cost of transporting a child should equal their own fare, and yet if the child is big enough to fill a seat he takes up room which could be sold to an adult passenger for full fare. After considering all the factors, Western Air decided to make a special half-fare rate

(Continued on next page)



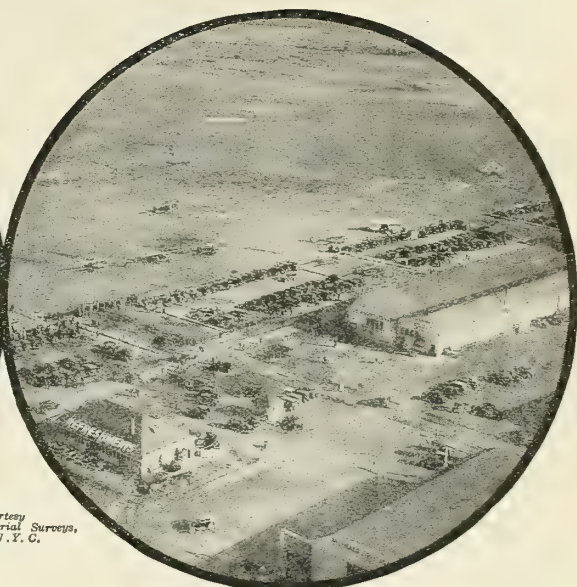
Crowd at an air meet at the airport of Montgomery, Alabama

# Imperfect vision is dangerous



*Sweating or fogging of lens obscures vision and makes flying difficult.*

# See clearly with LUXOR Goggles



*Courtesy  
Fairchild Aerial Surveys,  
Inc., N. Y. C.*

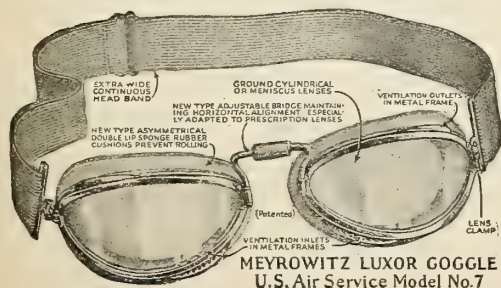
*Luxor Goggles provide crystal-clear vision under actual flying conditions.*

**M**ORE and more the safety-factor is being considered in the expansion of aviation facilities.

Long ago when flying was only a fad, LUXOR Goggles were the choice of experienced flyers, and today, LUXOR Goggles are still the most popular. Meyrowitz has provided perfect vision under all flying conditions.

A feature of LUXOR Goggles is the patented ventilating circuit which prevents steaming and fogging—also deflecting air currents away from the eyes.

Other advantages of the LUXOR Goggles have been welcomed by flyers. The clutch-type bridge provides perfect alignment. An asymmetrical cushion eliminates air seepage. The double-lip cushion makes the goggles perfectly comfortable, preventing head-strain and headaches.



It is important that you get the genuine LUXOR Goggles made by Meyrowitz. You will find them on sale by leading sporting goods and optical stores, aircraft dealers, flying schools and airports.

**IF YOU WEAR GLASSES YOUR LENSES CAN BE DUPLICATED AND FITTED INTO LUXOR GOGGLES**

**U. S. Air Service Model 7—\$13.75 Regular Model 6—\$9.75**  
(illustrated)

**U. S. Air Service Model 6—\$10.75 Luxor Model 5—\$7.50**

**NOTE THESE EXCLUSIVE FEATURES**—protected by U. S. Patents:

New type asymmetrical double lip sponge rubber cushions prevent rolling and air seepage—no metal can touch your face.

New clutch-type adjustable bridge maintaining horizontal alignment—especially adapted to prescription lenses.

Ventilation inlets and outlets in metal frames prevent fogging and steaming—no air currents can reach your eyes.

**E. B. Meyrowitz**  
INCORPORATED  
ASSOCIATED COMPANIES



**520 Fifth Ave., Dept. A., New York**  
MINNEAPOLIS ST. PAUL DETROIT PARIS

**Send for  
Catalogue  
LONDON**



(Continued from preceding page)

for children between the ages of 2 and 12, effective immediately on all lines of the system.

#### Los Angeles to Mexico City, Thirty-Two Hours, Ten Minutes

STANDARD AIRLINES, INC., has announced a working agreement with the Corporación Aeronáutica de Transportes whereby the joint activities of the two companies will shorten the traveling time between Los Angeles and Mexico City to 32 hours and 10 minutes, with a fare reduction of about \$20. The schedule is merely an agreement providing for an adjustment of both companies' schedules, and does not constitute a merger.

Those destined for Mexico City leave Los Angeles daily at 9:00 a. m. and arrive in El Paso at 5:15 p. m. A transfer is made to C. A. T. planes which leave at 6:00 a. m. the next morning and arrive in the Mexican capital at 5:15 p. m. via Chihuahua, Jiménez, Torreón and Zacatecas. Fokker F-10 super trimotors are in service over the Standard division to El Paso, and the Mexican line is using Hornet-powered Lockheeds.

#### Southern Air Transport Serving Box Lunches on Planes

BOX lunches, specially prepared to appeal to the air traveler, are a standard convenience on the S. A. T. lines, Dallas-El Paso branch. Lunches are taken aboard at Big Spring, and ordinarily consist of one combination sandwich of ham, lettuce and tomato; a combination sandwich of cheese, salami and pickle; a piece of fruit pie; an orange or apple, a bag of potato chips and after-dinner mints.

#### Continental Air Express Extends Service

THE Continental Air Express has extended its service along the Pacific Coast to include Long Beach and San Diego; two round trips being made daily. Headquarters in San Diego are at the Airtech School, Lindbergh Field. A working agreement has been made with the San Diego and Arizona railway for the delivery of passengers from San Diego to Agua Caliente, Mexico, and other points, by rail. Because of this air-rail combination, Continental offers the lowest passenger rate on any airline from Los Angeles to Agua Caliente, the round trip being \$16.50.

#### Two Fare Reductions Announced

GOOD news for passengers on Middle Western airlines is contained in recent advices to the effect that Embry-Riddle Aviation Corporation, of Cincinnati, and Stout Air Lines, of Detroit, have announced substantial fare reductions.

The Stout Air Lines have reduced fares on the Chicago-Detroit division from \$30 to \$24, increased business having made such a step possible. This is in line with this company's policy as announced some time ago by Stanley E. Knauss, vice president and general manager, of passing on to the passenger any saving resulting from in-

creased economy of operation.

The Embry-Riddle company announced a sliding scale of fare reductions on its lines from Cincinnati to Indianapolis to Chicago, varying from \$3 to \$16.50.

#### AIR MAIL NOTES

##### Pan American-Grace Gets Argentine Air Mail Contract

A TEN-YEAR contract for the transportation of air mail between Buenos Aires and New York City with the option of renewal for five years was recently signed by President Irogoyen of the southern republic and representatives of Pan American-Grace Airways, Inc. The line extends 7,100 miles from Buenos Aires, Argentine, via Santiago, Chile, Peru, Panama and Central America to the United States. Passengers and express will be carried in addition to mail.

Special arrangement was made with the United States Post Office Department to include mail from Buenos Aires to Canada. Postage rate is 75c per half ounce or fraction thereof.

##### Slight Decline in September Poundage

VARIOUS reasons might be advanced, but the plain fact is that the air mail lines of the country slipped back a trifle in September, after having been consistently breaking their own poundage records all summer. The total poundage in August was 698,062, whereas the total for September was 655,689, a decrease of 42,373 pounds. The daily average was 21,856 pounds, or a decrease below that of August of 1,412 pounds.

The most notable exception to the general slump was Southern Air Transport, which exceeded its August record of 10,353 pounds by carrying nearly 12,000 pounds.

##### U. S. Air Mail Now Exceeds All Europe

GRATIFYING, in view of the pessimistic sentiment above, is the summary of European air mail activities recently made public by the Post Office Department. Among the interesting facts presented was the statement that more mail is being carried every day in the United States by air than in all Europe combined. There was a gain of 200 per cent over the total poundage for the first six months of 1929 as compared with the same period of 1928.

##### Post Office Dep't. Plans New Line

ASSISTANT POSTMASTER GENERAL W. IRVING GLOVER announced recently through his bureau of information that advertisements will soon be offered for a new air mail line to run between Norfolk, Va.; Washington, D. C.; Pittsburgh, Pa., and Cleveland, Ohio. The route is already lighted between Cleveland and Pittsburgh, and the portion between Pittsburgh and Washington has been surveyed by the Department, and lights are expected by April 1, 1930. The new contract for the route will be in operation by that date, it is alleged.

The contract governing the present route

from Cleveland to Pittsburgh will expire March 27th, 1930. The present contractor is Clifford Ball, and the route is known as C. A. M. 11.

#### New Foreign Air Mail Line Connections

COMBINATION air-rail-water mail between the United States and points in Japan, France, Italy, Greece and Syria has been inaugurated, says Mr. Glover. Articles for dispatch to one of the above-mentioned countries should have the words: "By Air Mail" in that country's language prominently displayed on the envelope. Postage rates are, in addition to the regular postage, Italy, 5c, Greece or Corfu, 11c; Syria and Castelrosso, 33c per half ounce or fraction thereof.

#### REGULATING AIR TRAVEL

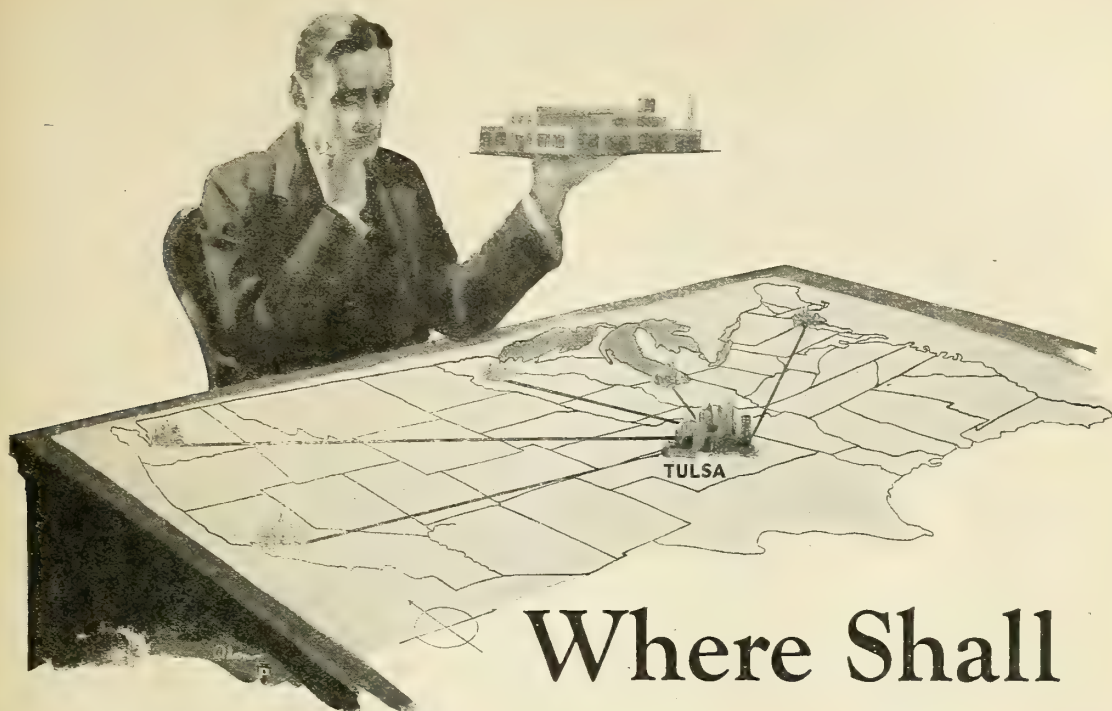
##### Kansas City Conference Opposes Federal Control

AMONG the numerous delegates to the Air Traffic Conference of the aviation industry held at Kansas City in September was Erle C. Halliburton, of Southwest Air Fast Express. He made a suggestion that a Federal body similar to the Interstate Commerce Commission be created to decide all questions of rates and responsibilities in the aviation industry as the I. C. C. has done for railroads. This idea was strongly opposed by General John F. O'Ryan, of Colonial Airways, and William P. MacCracken, Jr., the retiring head of the Aeronautics Branch, Department of Commerce. The railroads had enjoyed 35 years of free operation before the commission was created, argued Messrs. O'Ryan and MacCracken, and the airlines were not yet ready for such regulations. Mr. MacCracken then presented a resolution in favor of a single conference committee to study the whole rate matter. Both Mr. MacCracken's suggestion and that of Mr. Halliburton were rejected. The conference, believing that if any regulation were to be done everybody ought to join in, appointed eleven committees to study the many matters which are in confusion.

##### Department Publishes Uniform Field Rules for Airports

UNDER the provisions of the Air Commerce Act of 1926, the Department of Commerce can impose restrictions and licenses only on aircraft and pilots engaged in interstate air commerce. It can, and does, extend the privilege of licenses to aircraft and pilots who do not cross state borders, but operate within the confines of one state. A great majority of this latter class of pilots have taken advantage of the privilege of frequent inspection of airworthiness of machines and competence of airmen thus provided by the license requirements, but a great many have not. It is among this latter class that a great number of aircraft accidents occur. Some of them are unable to procure a license for various reasons, and in such cases they confine their activities to states having no air commerce law regarding the operation of aircraft.

(Continued on next page)



# Where Shall I Locate My Airplane Factory *to find the most receptive market?*

To correctly answer this vital question will go far towards insuring your success. . . . . We suggest "Tulsa" as the answer, for very specific reasons which deserve your investigation.

First, Oklahoma is the wealthiest per capita of all the Southern states. Here you find the three-fold combination which is bound to result in airplane purchases—wealth, long distances, all-year flying climate.

Second, Tulsa is the wealth center of this exceptionally wealthy state. That third of Oklahoma lying within ninety miles of Tulsa produces 59 per cent of the state's wealth.

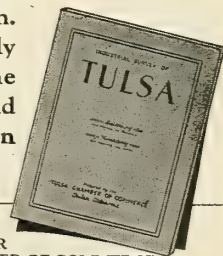
Third, a recent survey showed that of all classes, oil producers are investing most heavily in aircraft. Tulsa lies at the heart of the world's most prolific oil producing area

and is known as the World's Oil Capital.

Fourth, Tulsa is nationally central, thus within one day's flying time of any port of the United States, Southern Canada and Northern Mexico. She lies at the hub of the nation's skyways, and figures show her municipal airport *leads the entire country in the volume of commercial business.*

Tulsa has facts—not claims—to offer for your consideration. . . . For the complete, intensely interesting story attach the coupon to your letterhead and mail. . . . There is no obligation whatever.

*Send for  
This Book*



INDUSTRIAL  
COMMISSIONER  
TULSA CHAMBER OF COMMERCE  
Dept. R, TULSA, OKLAHOMA

Gentlemen: Please send me without obligation, your new industrial survey.

Name .....

Street .....

City .....

State .....

# TULSA

Hub of the Nation's Skyways





(Continued from preceding page)

The need for uniform state legislation has been clearly demonstrated by so many recent examples of confusion and laxity that the Department has compiled a suggested city or county ordinance and uniform rules for airports and landing fields, under the title of Aeronautics Bulletin No. 20.

The bulletin contains the suggested city or county ordinance which should be adopted as nearly as possible in the original form by all communities which sponsor airport programs, in order to provide the uniform treatment of the subject necessary to eliminate confusion and safeguard all forms of airport activity. In addition, it contains sections devoted to general rules for airports; flying, landing and take-off rules, running engines, flying instruction and test flights, parking and mooring areas, fire regulations and penalties.

Every community in states not covered by the Uniform State Law governing aeronautics should correspond with the Aeronautics Branch, Department of Commerce, which will furnish copies of the bulletin upon request.

#### Twenty States Require Federal Licenses

OUT of a total of fifty-two states, territories, districts and insular possessions of the United States, twenty states now require Federal licenses for all aircraft and airmen now operating within their borders. Ten states require Federal approval of all airplanes and pilots engaged in commercial flying; six require either state or Federal licenses, six require state licenses, and nine states require no licenses whatever.

#### Southern Regional Airport Conference

THE Aeronautical Chamber of Commerce, through its section of airports and airways, invited all members to attend a conference in Atlanta, Georgia, on the 14th of October for the purpose of laying plans for improving and studying the airport facilities of the southern section of the country.

Among the questions discussed were municipal airport planning and development, new airports and extension of airport facilities. Those who spoke, in addition to Chairman A. S. Hawkins, City Commissioner of Jackson, Miss., were: Andrew H. Heermance, Herbert Hahn, George W. Foster, W. Gordon Kuster, and William H. Mallon.

## NEW DEVICES AND METHODS

### Plane Controls Airport Lights

TO Wm. Earle Stilwell, Jr., young Cincinnati inventor, may go the credit for solving a problem that has long puzzled students of airport lighting, that of controlling airport lights from a plane in flight.

The device is simply a short wave radio transmitter with a special frequency for each rated airport. In practice, all that is necessary for a complete illumination of any field the pilot may visit after nightfall is a book with the list of frequencies given. By manipulating a dial the desired wave is selected, and upon approaching the field a button on the device is pressed, sending out the frequency which operates the airport light switches.

### Combination Airplane and Automobile Gas Station

METROPOLITAN AIRPORT, Van Nuys, Calif., is so close to Los Angeles that a great many novel ideas in airport arrangement are tested there. One of the latest is a combination airplane and automobile filling station, credit for which is given to the Union Oil Company.

On one side, the regulation automobile service may be obtained. On the other, an extension out into the field has fueling pits located underground and equipped with electrically-operated pumps. One feature of the device which will probably recommend it to many airports is that it will put an end to the annoying habit of car owners on the airport who fill their tanks with expensive aviation fuel on the plea that automobile gasoline is not obtainable.

### Chemical Gas Fights Crash Fires

TESTS recently conducted on the experimental grounds of the American-LaFrance-Foamite Corporation at Elmira, New York, graphically demonstrated what happens when an airplane catches fire after a crash. Two dummy airplanes, made of regulation wings, fuselage and tail assembly, were piled up in attitudes simulating a bona fide crash and freely sprinkled with gasoline about cockpit and engine mount, as if from a broken feed line. A torch was applied. Conflagration.

New methods of fire-fighting designed to aid airports where such crashes might oc-

cur were tested during the blaze. The first method was carbon dioxide gas under high pressure issuing from wide nozzles. The second dummy plane was extinguished in three minutes by means of Foamite pumped on the blaze from two hand-operated generators. A special feature of both systems is that the gases from the nozzles drive off the flames in a few seconds, allowing men to approach the burning wreckage without danger of injury from the intense heat.

### Runways Lighted by Novel System

AT the Gross Ile Airport, Detroit, Mich., installation of the first series of runway lights in the country is now in progress. The system was devised by Captain John S. Donaldson, former member of the Lafayette Escadrille, and now consulting engineer for Airport Lighting, Inc., of New York City.

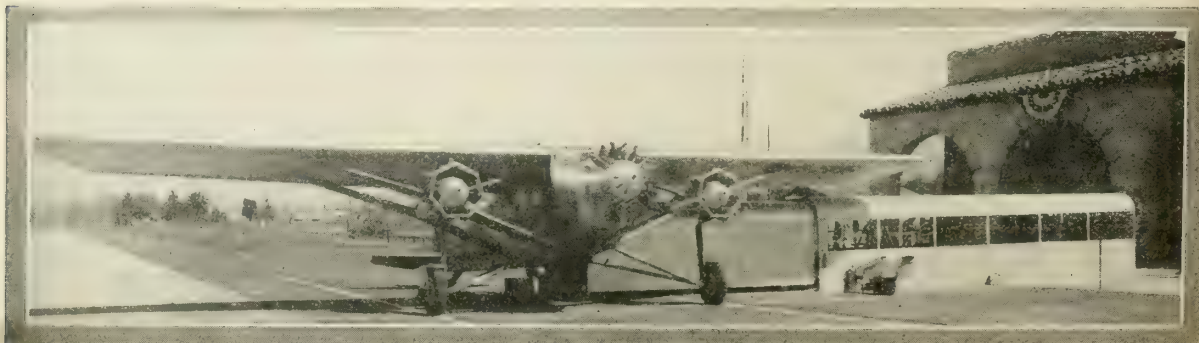
The new runway lights consist of powerful electric bulbs set in sunken concrete bases flush with the surface of the runway. Each light has a green lens set in the cover to distinguish the runways from the beacons and floodlights on other parts of the field. Each installation contains a heating unit which keeps snow and ice away from the lamp in winter, and prevents the accumulation of moisture inside the device as well. The lights are placed on both edges of the runways at intervals of 100 feet, and are operated automatically by the motion of a wind vane which lights the proper runway to agree with the direction of the wind.

### S.A.F.E. Lines Adopt Aerocar

FIVE Aerocars, pulled by Hudson coupes, were delivered to the terminals of Southwest Air Fast Express, with headquarters in Tulsa, Oklahoma, recently. The Aerocar is a 14-foot bus trailer, with two wheels and a device for attaching to a power car ahead. It is used to a considerable extent by airlines in transporting passengers from downtown ticket offices and waiting rooms to airports.

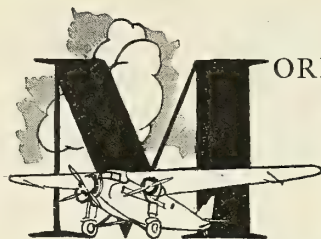
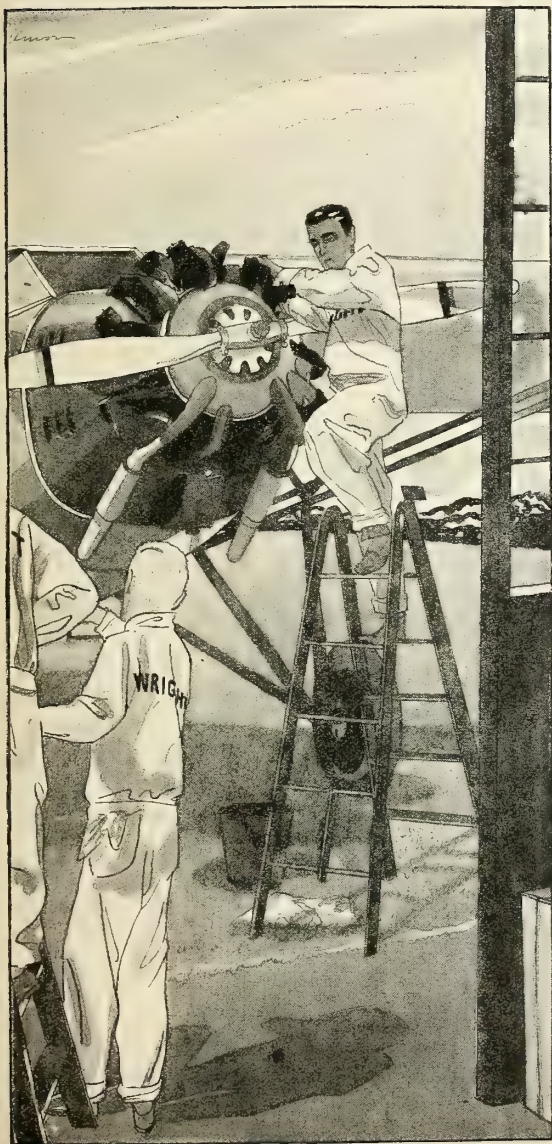
DURLAND TRAVEL SERVICE has arranged with Colonial Air Transport to sell special passages on its planes for the convenience of football fans going to Harvard and Yale games.

Harvard rooters will be carried from Newark to the East Boston airport, and Yale fans to the H. and H. Field, three miles from the Yale Bowl.



Bach trimotor transport of the Pickwick Airways preparing to take off at Grand Central Air Terminal, Glendale, California

# "PILOT MY OWN PLANE? WELL—AND WHY NOT?"



**M**ORE than eight thousand men and women are licensed to fly. But nearly half a million people buy and read the magazines such as this, devoted to the air!

To the four hundred and ninety-two thousand people who are not yet pilots, Wright, here and now makes the suggestion that they start!

Planes of today are capable. Wright "Whirlwinds" and Wright "Cyclones" are strong, dependable engines; pilots are skillful; landing fields daily increase in number and are constantly bettered in quality; while ground service equal to the best garages is flourishing at all good airports.

And most important of all, costs are coming down—(and never forget that it has been cost, not danger, that has limited public participation in airplane activities).

So to our non-flying readers of aviation publications, Wright suggests that they join the First Flight Club now—with the firm conviction that a few years hence will see them piloting a plane of their own!

Off the ground and go!



**WRIGHT**  
AERONAUTICAL CORPORATION  
PATERSON, NEW JERSEY







## STEEL FOR HANGAR ROOFS

By R. D. Snodgrass, Consulting Engineer, Truscon Steel Co.

**I**N the midst of much discussion as to the best type of hangar doors, the best materials for side walls and other details of hangar construction, it sometimes seems that not enough attention is being given the construction of the roof.

Extensive and careful study of hangar problems has led to the conviction that the roof presents at the present time perhaps the most important problem in construction. Walls, windows, doors and structural steel frames are to a large extent standardized, the principal variations being for the purpose of securing certain architectural effects. Roofs, on the other hand, may be built from a great variety of materials, with widely varying costs and with a great diversity of results as to efficiency and ultimate economy.

In considering the economy and utility of hangar roofs, one must give due consideration both to first cost and to maintenance expense. The roof represents a very considerable proportion of the investment in hangar construction, and is at the same time the feature of the building most subject to deterioration. Therefore, although it is important to see that no money is wasted in the matter of first cost, it is equally important to guard against the erection of a roof which is made attractive by a low first cost, but which will ultimately be made very expensive through high maintenance expense.

Not only must a roof be judged by its ability to turn weather elements, it must also be estimated with an eye to its insulating qualities. The difference between a roof with poor insulation value and one which properly prevents heat loss may be much more than offset by the additional coal or other heating fuel required in the building with the poor roof insulation. This difference extends even to a practical saving on heating equipment.

The fire hazard, in the minds of many persons, is the most important factor of all in selecting a roofing material. This is true

not only with reference to the individual building itself; the other hangars and buildings of various types on an airport all may be endangered by any explosion or fire because of burning embers being thrown or blown upon their roofs.

A careful investigation reveals that all types of roofing except two-inch planking and insulated steel roof deck must be discarded because of their excessively high first cost. It therefore remains to consider only these two types of roof construction.

As to first cost, planking unquestionably has a slight advantage. A first class plank roof, properly painted and water-proofed, may cost as much as fifteen per cent less than a high-grade steel roof deck properly insulated and water-proofed.

The qualification "high grade" has been used advisedly, because it seems self-evident that no hangar owner can afford to be persuaded to use a cheap type of roofing. If he does, within a very few years he will find that his increased coal consumption, high maintenance cost and rapid deterioration have boosted his expenditures much higher than they would have been had he used wooden planks or a high grade fabricated steel insulated roof in the first place. In fact, the probabilities seem to be that within a few years he will have to replace the cheap roof with insulated and water-proofed steel, rendering his original roofing investment a complete loss.

Modern steel roof decks of formed plates, made by several concerns for all types of buildings, adequately meet the requirements for hangar construction. These plates are rendered stiff and rigid by having pressed into them a series of ribs on their under sides. They are proof against corrosion caused by ordinary atmospheric conditions because they are manufactured from heavy gauge, copper alloy sheets. This type of roof construction will last indefinitely, requiring only a proper paint protection at

the time of installation in the hangar.

When insulated above by one-half inch of any one of the well-known insulating materials, a steel roof deck has a decided superiority, because this amount of insulation of almost any of the recognized brands has a substantially higher resistance to heat penetration than has a roof deck of two-inch planks, even when they are laid tightly together.

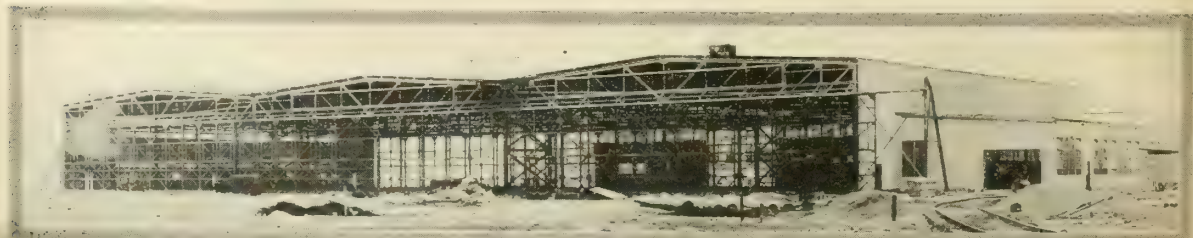
But no commercial wood planking remains tight. Under the dry inside heat during the winter months, the joints open and allow the heat to pass out between the planks. It quickly escapes through the thin roofing felt to the outside air, because the roofing has very little insulating value.

Furthermore, the constant shrinking and swelling of the planking caused by alternate hot and cold, wet and dry air inside the building, gradually weakens the felt water-proof roofing so that either a better and more expensive grade of roofing is necessary over wood than over steel deck, or patching and repairing becomes necessary in a very short time after installation. The fact that a steel deck has no appreciable shrinkage or expansion results in a large comparative saving in this single item.

The actual difference in cost per square foot of steel roof deck and two-inch planks gives an exaggerated idea of the ultimate net difference in the costs of these two types of roofing. The steel, being much lighter in weight, requires much less tonnage of structural steel in the building to support the roof. Furthermore, the cost per ton of the structural steel supporting steel roofing of the modern type is less because the holes necessary for bolting the plank to the structural steel are unnecessary when the steel is used. The steel plates are attached to the purlins or supporting members by patented clips requiring no holes for their attachment.

A comparison of the complete cost will show very little difference between a two-inch plank roof and an insulated steel roof when the saving in both tonnage and fabricating cost of the steel frame are considered.

(Continued on next page)



An example of Truscon steel deck roof structure: hangars at the Naval Air Station, Coco Solo, Panama Canal Zone, as they appeared when under construction and (top of page) when completed and in service



MOST  
PLANES  
DIDN'T HAVE  
WHEELS



WHEN U. S.

RUBBER BUILT THE FIRST    
PNEUMATIC AIRPLANE TIRES



When the United States Rubber Company first built pneumatic tires for aircraft, the landing gear for most planes consisted simply of two parallel skids of spruce or ash. Landing skids, however soon gave way to wheels and in 1908 both Orville Wright and Glen Curtiss equipped planes with 20" x 2" Hartford "Aviator" tires, built by the U. S. Rubber Company.

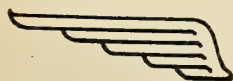
Larger and heavier tires soon followed and a 1910 U. S. advertising folder entitled "To Help You Fly" illustrates three sizes of pneumatic airplane tires as well as other aviation accessories.

Stinson-Detroit six-passenger cabin monoplane  
equipped with United States Airplane Tires

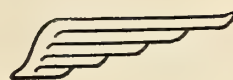
Today—with 20 years of actual experience in building tires designed expressly for the exacting requirements of aircraft—the U. S. Rubber Company offers a complete line of airplane tires in all sizes with either plain or non-skid treads. Every tire is of the exclusive web-cord construction thus combining light weight with great strength.

Phone United States branches for fast service.

UNITED STATES RUBBER COMPANY



UNITED STATES  
A I R P L A N E  
T I R E S





(Continued from preceding page)

As already noted, possibly the principal point to be considered in the selection of roofing for a hangar is its relation to fires that may be encountered. The most serious danger is that resulting from a gasoline tank explosion. Under these conditions, the flames reach the roof and "mushroom" out in all directions. Experience has shown that, under such circumstances, failure does not occur in the roof itself. On the contrary, the flames in their passage to the ceiling heat the supporting steel trusses which fail, thereby causing a collapse of the building long before the roof is seriously damaged.

There is but one way of preventing such a failure, and that is by heavily fireproofing all structural steel members supporting the roof. But such a process is too expensive to be considered. An occasional loss of a hangar would be far less costly than attempting to fire-proof all the structural steel in all the hangars.

The real advantage that steel roof decks have over any type of wood roofing becomes

evident when either a gasoline explosion or a truss collapse occurs. At such times the roof is broken down, and if it is composed of wood, the burning pieces will be scattered and thrown up in all directions. These blazing pieces and burning embers are likely to land on the roofs of other structures, and if these roofs also are of wood construction, there is serious danger of a general conflagration which might wipe out the entire group of buildings, resulting in great loss, not only from the structures, but also from destruction of their valuable and highly inflammable contents.

If, on the other hand, steel roof decks are used, only the one structure can be destroyed; all other buildings are protected safely from outside fires.

Not the least point to be considered is safety from lightning. It is true that one type of roof is as likely to be struck as another. But while a bolt of lightning will almost certainly cause fire to a wood roof, and might even allow the charge to jump to the contents of the building, a steel roof deck, acting as a lightning rod over the

entire building, will conduct the whole charge down the outside to the ground without damage to the building or its contents.

Differences between insurance rates on the two kinds of roofing will be relatively small. The rates will surely be based upon the portion of the structure providing the greatest fire hazard, namely the unprotected roof trusses, and upon the presence of gasoline or other highly inflammable material in large quantities.

Emphasis has been placed upon the permanency of the steel roof deck, upon its low maintenance cost, its saving in fuel for heating and in cost of heating equipment, and its insurance against the spread of fire. As much more might well be written concerning the many engineering advantages of steel over wood, and about the corrosion-resisting properties of the copper alloy steel plates.

Certainly, however, enough has been stated and implied to show beyond any doubt the advantages of fabricated steel, insulated and water-proofed, as roofing material for airplane hangars.

## WIND-DRIVEN GENERATOR for BEACONS

By S. R. Winters

**D**UPLICATING the experience of a farmer who extracts power from the air, the Airways Division of the Department of Commerce has installed a wind-driven electric generator as a source of illumination for a standard beacon light on the Atlanta-New York airway. Situated on an 80-foot tower, near Alexandria, Virginia, this is the first installation of its kind along the 10,183 miles of lighted airways.

The economic advantage of a wind-driven electric-generating set is that it does not require ceaseless attention of a caretaker. Maintenance of the new lighting unit involves application of grease to the generator at six-month intervals and replenishing the water supply of storage batteries once a year.

If this experimental installation proves its claim to perpetuity, the original unit on the Atlanta-New York airway will not only be maintained, but other installations will be made. It is likely that even some of the more expensively operated of the 1,406 electrically lighted beacons may be displaced by the wind-driven source of energy. The Alexandria, Va., beacon of this novel type was placed in operation on July 23 and on July 30—exactly one week later—an examination indicated that the wind-generating device had imparted 14 kilowatt hours to the storage battery. The latter consists of two units in multiple of sixteen cells, of 400 ampere-hours capacity each—a total capacity of 800 ampere-hours.

The Airways Division of the Department of Commerce, using its flying laboratory for conducting tests relating to light as well as radio beacons, made a night flight to observe the behavior of the new wind-electric-generating beacon. The rotating beacon was turned off, leaving only the flashing beacon in operation. The flashes or blinks of the latter were reduced from thirty-two

to twenty-five flashes a minute and again—five minutes later—the flashing rate was curtailed to twenty-two blinks a minute. This is the lowest speed permissible by the 27-ohm resistance unit in the motor circuit. The flashes were then increased to twenty-five per minute and again to thirty-two blinks a minute. This test was to determine the most suitable flashing rate, which was found to be twenty-five blinks a minute.

To ascertain the luminous effectiveness of the new light-beacon, the test airplane of the Airways Division flew to a point halfway between the Quantico, Va., intermediate flying field and the Widewater beacon, where the blinking of the new beacon could be observed against the brilliantly electrically-lighted background of the National Capital. The distance of the test plane from the wind-driven electric-generating beacon was twenty-four miles. The automobile headlights, street lamps, and other electric lights, which are in such profusion in this area, offered formidable competition to the airway beacon light; otherwise, we are told, the effective range of the new method of lighting airways would be appreciably greater than twenty-four miles.

C. I. Stanton, engineer of the Airways Division, in his official report of the test to Chief Engineer F. C. Hingsburg, points out, "It is believed that in an area of little or no competitive light, this distance (twenty-four miles) could be materially increased. The main difficulty in locating the light was the matter of confusion with other lights, such as automobile headlights, street, and other lights, which tend to blink as the automobiles bumped along the road, or as obstructions, such as houses and trees, passed between the various competitive lights, causing an apparent flashing. As a matter of comparison, it is interesting to note that the revolving beacon on Bolling

Field was not visible beyond Site No. 54, which is approximately seventeen miles from Bolling Field. From Site No. 55, at Alexandria, the revolving beacons at Sites No. 54, Occoquan; No. 53, Quantico; and No. 52, Widewater; were visible—the last-mentioned light being thirty miles from Site No. 55. The course lights at Site No. 54, Occoquan, and Site No. 53, Quantico, were visible from Site No. 55, a total distance of approximately twenty-one miles. It is, therefore, apparent that the range of visibility of the flashing beacon is approximately midway between that of the course lights and the 24-inch revolving beacons.

"As a result of observing the beacon at the several speeds mentioned, it was concluded that the beacon effectiveness was increased by reducing the speed from thirty-two to twenty-five flashes per minute, but no apparent improvement was noted in the further reduction to twenty-two flashes per minute. It is, therefore, concluded that a flashing rate between twenty and twenty-five flashes per minute is about correct. It is believed that a slight increase of the luminous period might be desirable, but it appeared as though the duration of flash, which varied between 29/100 and 41/100 of a second at the various speeds observed, was sufficient to produce full intensity. The fact that the introduction of the comparatively large resistance in the motor circuit had so little effect in the reduction of its speed indicates that the one-eighth horsepower motor is several times more powerful than is necessary to operate the sign-flasher. It is believed that a one-twentieth horsepower motor will serve just as well and will use considerably less current.

"The locomotive headlights used in the test were borrowed from the Southern Railway Company, since they were the only type of 32-volt bulbs which were available in this city. It is probable that the installation of 200-watt or 300-watt ringtype fila-

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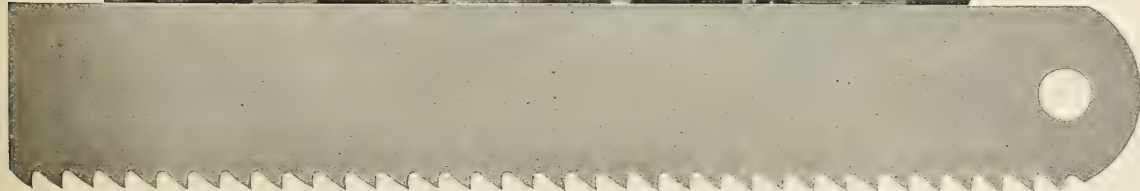
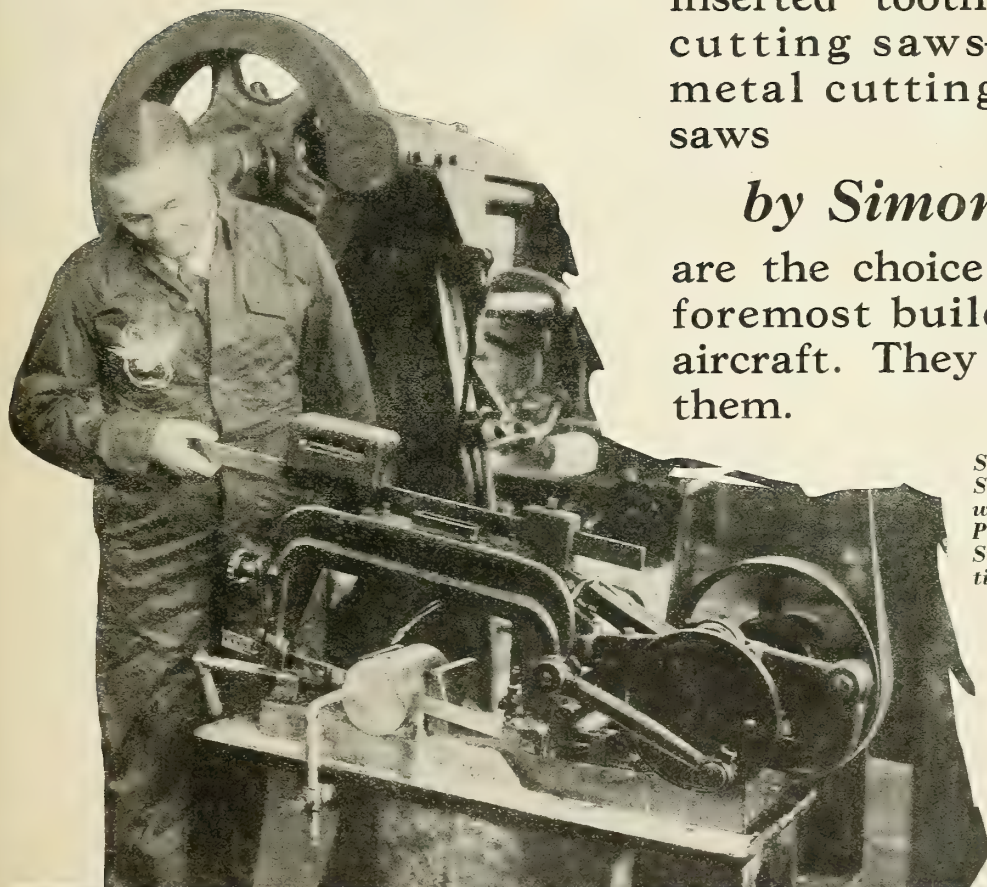
# Simonds for Metal Cutting

—in the world's most exacting industry, Hack Saw Blades—(high speed and tungsten steel)—solid or inserted tooth metal cutting saws—files, metal cutting band saws

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are the choice of the foremost builders of aircraft. They all use them.

*Simonds Hack Saw Blades at work in the Plant of the Sikorsky Aviation Corporation.*



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**FITCHBURG, MASS.**

**EIGHT FACTORIES**

**SIXTEEN BRANCHES**

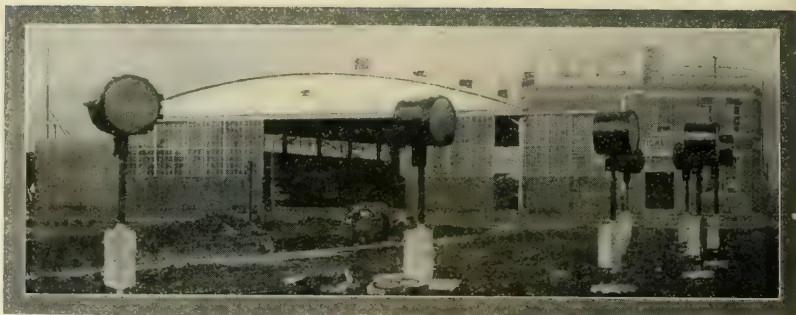


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ment bulbs in the code beacon will improve the light given by this unit. The Airways Division has on order a small supply of locomotive headlight bulbs and 200-watt P. S. 30-ring-type filament bulbs, which can be installed when received. It is further proposed that the rate of flashing be reduced to twenty-four flashes per minute."

The original installation of this so-called wind-electric-generating set, rated at 1,000 watts, consists of the following components and arrangements: An astronomic time clock, operated by 110 volts of alternating current from a commercial supply at the beacon site, which switches on the 32-volt current from the 800-ampere-hour battery. Connection from this clock is made to the sign-flasher motor and to the flasher switches in multiple. From the sign-flasher switches, connection is made to the three lamps of the beacon in multiple. The beacon itself consists of one acetylene airways routing beacon with one standard electric-code beacon superimposed thereon, mounted in the southwest corner of the regular beacon platform. Three 32-volt, 250-watt locomotive headlight bulbs are at present installed in the beacon. They flash at the same time. The sign-flasher is equipped with a one-eighth horsepower, 32-volt, direct-current motor, rated at 1,800 revolutions per minute. This operates the sign-flasher at such a speed as to give thirty-two flashes per minute. The luminous period is fifteen per cent.

The wind-driven electric-generator, when employed on farms for generating power, requires negligible attention. The water supply of the storage batteries is replenished once in two years, although when this power plant is employed for lighting airways it is deemed advisable to refresh the batteries with water at twelve-month intervals. The generator is greased at six-month intervals. "The lamps," reports Engineer C. I. Stanton of the Airways Division, "are rated at 500 hours life. This would be equivalent to between nine and ten months' operation at fifteen per cent luminous period, but it would probably be advisable to change these lights once each six months, at the time of greasing the generator unit. The sign-flasher is at present the weak point in the system."



Bank of floodlights at the airport at Montgomery, Alabama, with the combination hangar and administration building in the background

## AIRPORT CLUBHOUSE at MONTGOMERY

By L. G. Mason, *Manager of Montgomery Airport*

**M**AKING an airport pay as it goes is one of the very real problems confronting pioneers in the modern business of aviation, and is a problem that must be worked out in a careful apportionment of costs to the various departments in a field's operation.

Some departments of the field must show sufficient profit to overcome losses that will occur in other very necessary departments. As with any other business, some departments will show a direct profit whereas others must be, at least, indirect. An equitable combination is necessary.

Field lighting, for example, is one of those departments which cannot be operated at a direct profit at airports that have no daily air mail lines. There will be some compensation in night passenger-carrying, but the result will not be satisfactory if this department has been expected to operate on its own.

The Montgomery Airport, in the Black Belt in Alabama, which is operated by the Montgomery School of Aeronautics, has a plan whereby it is believed this department can be made to contribute more profitably on its own upkeep.

Montgomery Airport boasts its own clubhouse. As those who have visited airports over the nation will know, this is an unusual feature. Probably one reason is that most airports are located too far from the city to expect the regular patronage of the resident populace. Since Montgomery

Airport is only two miles from the city limits, it has a peculiar advantage in this respect. The airport is situated on one of the main paved arteries leading from Alabama's capital city. A continuous stream of traffic passes its gates.

The clubhouse is built to cater, not only to flying visitors to the field, with quarters providing for their comfort overnight, but also to special dinner parties from town. The interior has been built with elaborate attention to detail. Extending the entire length of the building is the reception room and dining room. It has been furnished in the latest modernistic appointments. At one end is a stone fireplace, adding to the picturesque beauty of the arrangement. Paralleling this room is a long, enclosed porch, equipped with chairs and tables. A famous Southern chef is in the kitchen. There are liveried servants for the patrons. And over them all is Mrs. N. L. Goldthwaite, member of one of the older Southern families of Alabama, who serves in the capacity of hostess and manager.

The part played by the field lights in this scene is obvious. Outside, the rotating beacon and the floodlights lend the necessary atmosphere to the place. One is continually reminded that he is dining at an airport.

This plan already is showing results. This clubhouse should become one of the most profitable departments in the operation of the airport at Montgomery. And the field lights are playing their part.



Reception room of the clubhouse at the Montgomery, Alabama, airport; right, exterior view of the building



## NATIONAL SHELBY AIRCRAFT TUBING

NATIONAL-SHELBY Aircraft Tubing conforms in every way to the same high standards of quality and accuracy of dimensions as the established line of NATIONAL-SHELBY Mechanical Tubing long used by automobile manufacturers and by makers of other high class mechanical constructions. Every foot of this product passes through an intensive system of testing and inspection. The tests for both chemical and physical properties are made to conform to U. S. Army Specifications No. 57-183 for streamline tubing, No. 57-180-1A for mild carbon seamless steel tubes, and No. 57-180-2A for chrome-molybdenum seamless steel tubes. All chrome-molybdenum tubes are made of electric furnace steel of exceptionally high quality and durability. Complete analysis and information on chemical and physical properties will be gladly furnished.

NATIONAL-SHELBY Aircraft Tubing is carried in stock by distributors located at convenient points throughout the country. These stocks are carried in specific lots so that actual test reports which accompany shipments from the mill can be furnished for each lot of material at the time of delivery.

Write for booklet "NATIONAL-SHELBY Aircraft Tubing" which furnishes, in compact, handy form, information concerning seamless steel tubing for designers and builders of various types of aircraft.

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# Three letters



LOUISE THADEN

Winner of the Women's Heavy Plane Derby,  
Santa Monica to Cleveland,  
August, 1929

**Travel Air Company**  
Manufacturers of  
Travel Air Planes  
Wichita, Kansas

September 13, 1929.

Kendall Oil Co.,  
Bradford, Pa.

Dear Mr. Shearer:

- Attention Mr. Shearer -

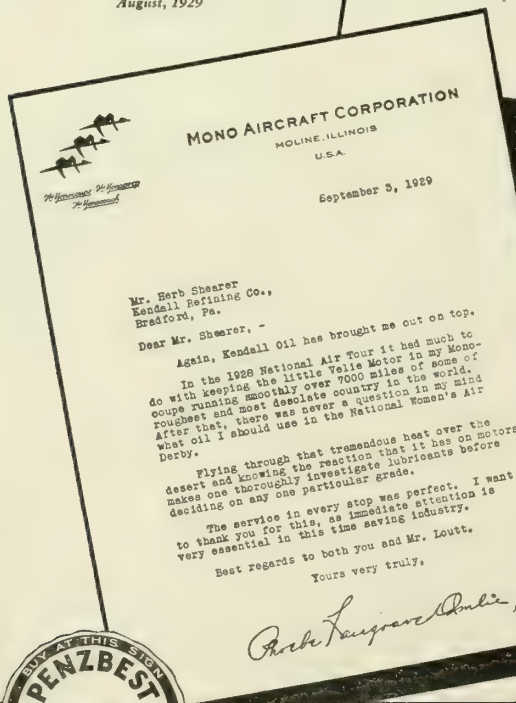
There is little I can say to add to the gratification I experienced in crossing the line first in the recent Women's Derby from Santa Monica to Cleveland.

I am mindful of the necessity in putting the best there is into what one is doing in order to expect the honors of first place and that is why your oil was the choice to properly lubricate my Wright powered Travel Air which brought victory.

My desire to recommend your product prompts this endorsement.

Very truly yours,

*Louise Thaden*



PHOEBE F. OMLIE

Winner of the Light Plane Derby, Santa Monica  
to Cleveland, August, 1929



# KENDALL

# from three who won

## Some first-hand testimony from first-class flyers on the results of Good Lubrication

WHEN the news went forth at Cleveland that every winning motor in all classes of all the National Air Derbies were Kendall lubricated, everyone realized that Aviation had definitely chosen its lubricating oil. A choice that was from the first inevitable, to those who were acquainted with the Kendall Sign, the symbol of the best in lubrication—a familiar and welcome sight at the airports of the country.

The three distinguished flyers whose faces we are privileged to reproduce on these pages, two very winning pilots and one ever winning pilot, declare their faith in Kendall Oil in unmistakable terms.

Louise Thaden, speeding her swift Whirlwind Travelair from Santa Monica to Cleveland to win the Women's Heavy Plane Derby, Phoebe Omlie, making the trip in her spunky little Warner-powered Monocoupe to win the Light Plane Derby, in addition to taking first place in Event No. 1 for Closed Course Races at Cleveland for light planes, using Kendall "as usual," have won the admiration of a nation. Generously, they testify to the part played by Kendall Oil in their hard won victories. Read their letters on the opposite page.


When Harry Brown set his Hornet-powered Lockheed Air Express down in front of the grandstand at the Cleveland Airport, having flown from Los Angeles in 13 hours and 15 minutes to win the Non-Stop Derby, he had completed a great flight in the face of inclement weather. Read his letter reproduced on this page in which he reports that his Kendall Oil pressure remained constant throughout the long flight despite a variable temperature of 62° to 76°.

There is one quality in an aviation oil that is paramount, and that is purity. Kendall is a pure oil. It cushions every moving part, seals pressure and increases power. It lubricates freely at freezing temperature; it does not break down under severe heat. Kendall Oil, the all-Bradford Grade of Pennsylvania Oil, is the purest yet discovered on any flying field. It is the chosen lubricant in Aviation, where speed, economy and satisfactory results are desired.

We will be glad to send you some interesting information about Kendall Oil together with a list of airports where it is obtainable. Address the Kendall Refining Company, Bradford, Pa.



HENRY J. BROWN  
Winner of the Non-Stop Derby, Los Angeles to Cleveland,  
August, 1929



September 3, 1929.

Kendall Refining Co.,  
Bradford, Pa.

Attention - Mr. I. H. Shearer

Gentlemen: -

Before leaving Los Angeles preparatory to the non-stop flight to Cleveland my plane was serviced with twenty-three gallons of Kendall Oil. My oil pressure after ten minutes running, with a variable temperature of 62° to 76°, remained constant thirteen hours, fifteen minutes and seven seconds, at the R.P.M. of the motor was turning at the start and finish of the flight. A flight of this character under conditions of variable oil temperatures, carburetion and R.P.M. must prove a real test to any high grade aviation oil.

Believe me most enthusiastic as ever for your product.

Sincerely yours,

*Henry J. Brown*

OIL

MADE FROM 100%  
BRADFORD GRADE OF  
PENNSYLVANIA CRUDE





# TECHNICAL

## THE NEW BRITISH AIRSHIP, R-101

**A**FTER extensive research and experimentation with various features of design and construction, extending over a period of several years, the new giant British airship R-101 made its first trial flight from Cardington, England, on October 14th. The largest rigid dirigible built thus far, the R-101 during its initial test in the air covered a distance of between 200 and 300 miles over a circuitous course which included a cruise over London. According to dispatches received in America, no attempt was made to ascertain the high speed of the ship, for a speed of only 58 miles per hour was attained, and that on the power of but three engines. Upon leaving the air station at Cardington, the dirigible rose gracefully and smoothly to an altitude of about 2,000 feet, which she maintained throughout most of the flight. During the trip the officers aboard were in constant communication with Cardington by wireless telephone.

The R-101 is the outgrowth of the British Airship Development Program, which includes the construction of two 5,000,000-cubic-foot airships of the rigid type, the R-101 and the R-100. The former was built by the Air Ministry at the Royal Airship Works, Cardington, and the latter, now nearly completed, is being built for the Air Ministry by the Airship Guarantee Company at Howden, York.

The purpose of the program, as undertaken, is not to inaugurate regular commercial services with the present ships, but to test the practicability of aircraft of this type for future commercial operations.

Because of the immense size of the two airships, many new problems in design and construction were encountered, with the result that the completion of the ships was delayed much longer than anticipated. The R-100 and R-101 are not sisterships, for the designers of each had, subject to certain general requirements, a free hand in the design.

The gas capacity of R-101 is approximately 5,000,000 cubic feet, giving a lift of something over 150 tons. Her length is about 732 feet, her maximum diameter about 132 feet, her height including control car about 140 feet. The length-diameter ratio is  $5\frac{1}{2}$  to 1. The shape was adopted after exhaustive model tests at the National Physical Laboratory which showed it had good aerodynamic efficiency.

The passenger accommodations are located on two decks inside the ship in the bottom portions of bays 6-7 and 7-8. The upper deck has an area (exclusive of the promenades) of 5,550 square feet. The lower deck has an area of 1,730 square feet, which can be increased later, if necessary, to approximately 4,000 square feet by means of side wing decks.

On the upper deck is located a large lounge with promenades on either side, from which the passengers may obtain an outward view through windows in the outer cover. This deck also carries a separate dining room for fifty persons and a number of two-berth sleeping cabins. Washing facilities, which consist of hand basins arranged in cubicles, are also on this deck.

The lower deck carries the captain's control room, and beneath this a control car projects outside the outer cover. There is open communication between the control room and the control car. Adjacent to the control room is a separate wireless cabin.

The kitchen, with its electrical cooking arrangements, is located on the lower deck, and a small lift communicates between this and the dining room on the upper deck.

The electric distribution room and a ventilating chamber is also on the lower deck. From this chamber an electrically driven fan circulates the air in the passenger compartment through a large radiator fed by steam from two of the airship's main engines, and induces a proportion of fresh air from outside. When the heat is not required, the radiator is lowered outside the hull to be cooled in the ordinary way.

A corridor running along one of the bottom longitudinal girders will be used for

communication for passengers between the passenger accommodation and the point near the nose of the ship from which they will enter the ship at the mooring tower. This corridor is slightly larger than that provided in an ordinary European train.

The machinery of the airship is carried in five independent power units, each arranged to be self-contained and easily replaced by spare units. Such an arrangement avoids undue delays resulting from a breakdown in the machinery, since a complete power car can be removed for overhaul or repair and another attached to the airship more quickly than an engine can be taken out of a car and replaced. Two power units are attached to frame 4, two to frame 9, and one on the center line at frame 11.

All these units were run on a special test gantry before being attached to the ship. This gantry is so constructed that the power unit can be inclined in order to represent the condition of the airship pitched up or down. An auxiliary engine and propeller is arranged in front of the unit to throw a stream of air over it so as to produce as closely as possible the conditions of actual flight.

It was originally intended to fit variable pitch propellers to enable all the engines to be reversed. The development of such a propeller for the Tornado engine, however, is not yet complete, and, consequently, the R-101 made its first flights with four engines to go ahead and one to go astern.

There is a small auxiliary engine by which the main engine is started through a Bendix gear. This auxiliary also drives an air compressor in two of the units, the compressor being required for the transfer of fuel in the ship. In the other three units, an electric generator is fitted in place of the compressor; this generator can be driven by the auxiliary engine when the ship is not underway. When, however, the ship is proceeding at speeds in excess of 60 miles per hour, the generators are driven by variable pitch windmills which automatically keep the speed of rotation constant.

Great care has been exercised to provide good protection for the engineer in the car, and yet to allow free access to all parts of the engine so that reasonable repairs can be executed in the air without difficulty. For example, a cylinder head can be removed and, if necessary, replaced by a spare one. These results have been achieved within a car of relatively small cubic capacity (no greater than that of R.33's wing cars) and of clean external form.

In those engine cars which are near the passenger space, arrangements have been made for delivering the steam to a radiator

(Continued on next page)



P & A Photo

The giant R-101 over its mooring mast

# Just Published!

## The Navigation of Aircraft Practical Avigation in All Its Phases



RAMSEY

Here at last is a book on avigation that is practical, one that tells you everything you want to know about navigating an airplane. It is the only book in print that recognizes the vital difference between navigating 200 miles, 800 miles, or 3000 miles. It is a work so useful and common-sense that no flyer can afford to overlook it.

The author is Lieutenant Logan C. Ramsey, United States Navy. He is a naval aviator and an acknowledged authority on avigation. When the United States Navy started its section of aerial navigation for the Hydrographic Office, Lieutenant Ramsey was selected from the entire naval personnel for the work. He instituted the section and was the first officer in charge of it. His interests in navigation have always been directed toward the aerial branch. How much you profit from this viewpoint can be realized only by actually seeing the book and considering it in relation to your personal needs.

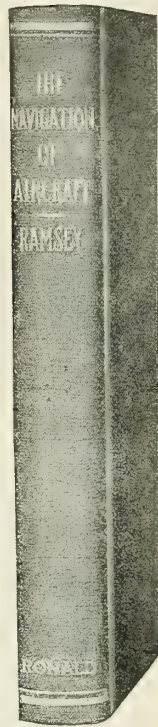
You cannot become a transport pilot unless you know aerial navigation in all its phases. This book will qualify

you on all points. It sets a proper balance between the three branches of avigation, piloting, dead reckoning, and aerial astronomy, something no other book accomplishes. In actual working value it stands alone—its 234 pages give as useful and vital information as can be bought—Ramsey is as practical as bread and butter.

Among the topics covered are, maps and charts; systems of projection; panelboard instruments; drift indicators; accessories; compasses; compass compensation; dead reckoning and plotting; methods of working dead reckoning; effect of wind in dead reckoning; determining the wind, the greatest problem of avigation; plotting and dead reckoning problems and solutions; piloting; radio aids.

Also aerial astronomy; celestial observations; time and the conversion of time; Summer lines; identification of stars; practice of navigating aircraft; advice and equipment; navigational procedure in practice; using aerial astronomy; determination of courses; blind flying; completely worked out examples of navigation; dead reckoning in the air; application of aerology to avigation; weather maps; pilot charts; dead reckoning and aerology.

234 pages, 50 illustrations, Price \$4.50



## Other Practical Books on Aeronautics

### Elements of Aviation

by Colonel V. E. Clark, formerly Chief Aeronautical Engineer, U. S. Army. 193 pages, 24 illustrations, price \$3.00

Will give you a clear understanding of the fundamental reasons why an airplane flies, why it is stable or unstable, controllable or uncontrollable in various attitudes and conditions—in short, "why an airplane does what it does." Its explanations are simple but absolutely authentic. It will help the beginner learn more rapidly and to become a better and safer pilot. The veteran flyer will find in its pages an explanation of many questions regarding the behavior of a plane that may have bothered him. The flying instructor will find here simple but thorough answers to many of the puzzling questions that his students ask.

### Practical Flying

by Major B. Q. Jones, Air Corps, U. S. Army. 210 pages, 6 illustrations, price \$3.00

Experienced airmen enthusiastically endorse this new training manual for airplane pilots by a veteran Army flyer and instructor—they say it will save many crashes and lives. It describes all the parts of a plane, instruments, etc.; maneuvers in the air; and explains technical expressions and slang terms. Covers practical subjects like: the most useful instruments for each class of flying, particularly "blind" flying; why a magnetic compass spins during for flying; "dead stick" landings; causes of crashes during take-offs and turns for landings; how to recognize stalls in time and how to get out of them easily; suggestions for progressive lessons right up to the license flight, etc., etc.

### Simple Aerodynamics and the Airplane

by Charles N. Monteith, Chief Engineer, Boeing Airplane Co. 3rd edition revised by Colonel C. C. Carter, U. S. Military Academy, West Point. 418 pages, 211 illustrations, price \$4.50

A completely revised and enlarged edition of a famous work which is widely used as an introductory text in ground and flying schools, colleges, technical schools, and universities. Eight years teaching experience with previous editions at West Point Military Academy is represented by this new book. This amply insures the accomplishment of its instruction purposes. The book is also ideally suited to home study use, as the discussion is not highly technical, and many review questions and more than 200 illustrations greatly clarify the text. The scope of its contents is so broad and inclusive that novice and expert alike can use it to advantage. It presents a lengthy discussion of accessories, materials, typical planes, and equipment in addition to its discussion of aerodynamics. Among the topics included in the discussion are, characteristics and types of airfoils; explanations of lift and drag; rate of climb; landing speeds; parasite resistance; characteristics of aircraft engines; component parts of an airplane; stability; control surfaces; the propeller; airplane performance; dynamic loads; maneuverability and controllability; structural considerations; wind tunnels; methods and instruments for navigation of aircraft; airplane accessories—parachutes, radio, cameras, etc., etc.

### Aeronautical Meteorology

by Willis Ray Clegg, Senior Meteorologist in Charge of Aerological Division, United States Weather Bureau. 144 pages, 44 illustrations, price \$2.50

Furnishes information needed to understand weather maps at a glance and for applying local observations in forecasting prospective flying conditions. Covers weather forecasting from clouds; average height of clouds of each class; variation in direction and velocity of winds with change of altitude; frequency of winds from each direction at various altitudes; characteristics and dimensions of thunderstorms; general circulation of the atmosphere; visibility, instruments and methods of observation; cyclones and anti-cyclones, etc.

### Aircraft Power Plants

by E. T. Jones, Chief Power Plant Engineer, Wright Aeronautical Corporation, and other experts. 208 pages, 104 illustrations, price \$4.25

A practical and useful manual for all who use airplane engines, sell them, and design and manufacture airplanes or engines. The book explains and compares favorable

and unfavorable features of engines and accessories, also performance characteristics of each. Points out adaptability for various purposes with practical notes on their operating features. The various kinds of heat engines are clearly explained and compared without going into thermodynamic formulas. The section on propellers includes engineering formulas and plan-forms sufficient for design of ordinary types. Sequence of operations necessary in design computations included. The accessories described include ignition systems, carburetors, fuel piping, pumps, reduction mechanisms, superchargers. Valuable information is given on lubrication and quality of engine fuels.

### Aircraft Instruments

by Herbert N. Eaton, and other experts of the Aeronautic Instruments Section, U. S. Bureau of Standards. 269 pages, 68 illustrations, price \$5.00

Describes more than 175 types and makes of aircraft instruments. Gives not merely the full mechanical explanation of each instrument but also includes a summary of the principles upon which it operates. Provides practical information on installation and maintenance of instruments which will prove particularly helpful to airplane owners, pilots, and mechanics. Covers altitude, attitude, airspeed, and engine revolution indicators; earth inductor compass; oil and radiator thermometers; turn and bank indicators; etc., etc.

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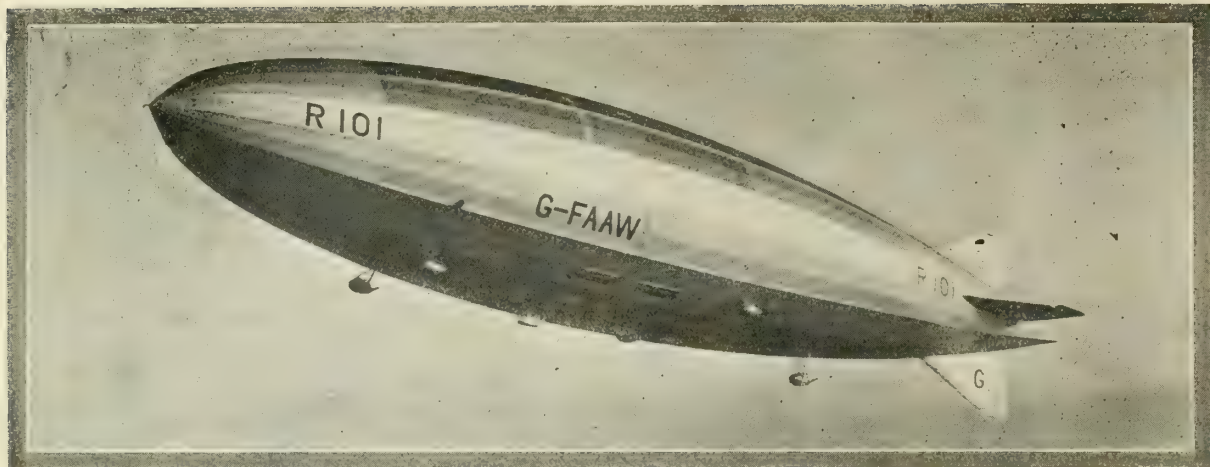
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The British rigid airship, R-101, on its initial test flight over Cardington last month

(Continued from preceding page)

which will be used for heating the passenger compartment. When this heating is not required, the steam radiator is lowered so as to project below the outer cover of the airship and be cooled by the passing air. When the passenger heating system is in operation, the cooling of the engines will be achieved without any increase of the resistance of the airship.

Until the airship has completed its trials, no detailed figures can be given as to useful load. Much depends, for example, on fuel consumption. The useful load of R-101, however, has been to some extent sacrificed in order to embody certain experimental developments which were felt to be of great importance for the future; e.g., the unbraced ring and the heavy oil engines. Consequently, cabins for fifty-two only have at present been fitted.

The hull of the airship may be described as being divided into three portions, the central body, the nose and tail.

The central body consists of ten large transverse frames of a novel type, numbered respectively 3-12 inclusive, connected by longitudinal members. There are fifteen main longitudinals and fifteen intermediate members, or reefing boom girders. The latter are not an essential part of the main structure but are provided for the support of the outer cover. This portion of the airship carries the passenger accommodations, all power cars and the control car.

The main longitudinals and transverse girders are triangular members, having tubular booms of high tensile, stainless steel.

Duralumin die stampings are used largely for main joints, and all members are interconnected by bolts. In addition to structural efficiency, ease of erection and the possibility of accurately calculating the distribution of stresses were some of the main objects of the design. Messrs. Boulton and Paul were responsible for the design and manufacture of the members and joints of the hull framework to specified geometrical dimensions and loads.

The transverse frames of the airship differ considerably from the conventional type of

Zeppelin frame. On the R-101 the frames are sufficiently stiff without the use of transverse bracing. In an experiment carried out with one of the largest of these frames, it was hung up at a single point at the top and a weight of six tons was loaded on to the bottom of the frame. The effect of this was to cause an extension of the vertical diameter of only approximately 4 inches on a diameter of 130 feet.

This type of ring has many advantages for large airships, but it introduces a further problem in the design of a suitable bulkhead for separating the gas bags and preventing longitudinal surging of the lifting gas. This problem has been solved in the R-101 by the parachute type of bulkhead.

The special type of girder which has helped to make this new departure possible has the advantage of extreme simplicity, cleanness of design and ease of assembly. With the earliest types of girder it was not possible to have a standard design of joint; the girders were fitted together and riveted *in situ*, in the best way which offered itself. In the present type, joints are standardized by means of special end pieces into which the booms of the girders are bolted; and so rapid and simple is the process of assembly that each ring may be built up from its component girders by ten men in one week; and the whole bay by eleven men in a fortnight.

In ring No. 5, there is access by means of ladders and stairways around the inside of the ring to a cockpit in the top of the ship. In several of the rings, ladders and stairways are provided up to the mid-height, from whence the crew can proceed along the ship on the longitudinal girders between the gas bags and the outer cover for the purpose of inspecting the gas valves which are situated at the mid-height.

The fitting of fuel tanks and piping, ladders, transverse gas bag netting, etc., into the ring is done while the ring is still lying on the ground. In the same way, the fuel and oil piping in the longitudinal is fitted in on the ground. Consequently, once a transverse frame is erected vertically into place (a very simple operation which occupies only about twenty minutes), no

further installation work has to be done in the air, except for the joining up of the longitudinals between one transverse frame and the next, together with the fuel pipes, etc.

The large increase in the size of the airship has made it possible to employ high tensile stainless steel in the construction of certain parts, and thus secure a saving of weight in the structure, since the type of steel used is, strength for strength, lighter than duralumin. Because the gauge required would have been too thin for practical working, the use of steel was not possible in the older and smaller airships. Duralumin forgings are used for the joints; and considerable research was necessary before a satisfactory technique could be evolved for the production of these joints, and for the drawing and rolling of the high tensile steel.

The problem of protecting from corrosion the large surfaces of steel and duralumin in the hull of the airship required special attention. All steel used in the girders is stainless and is sandblasted and covered with grey lacquer. Zinc-plating is used on all other steel parts.

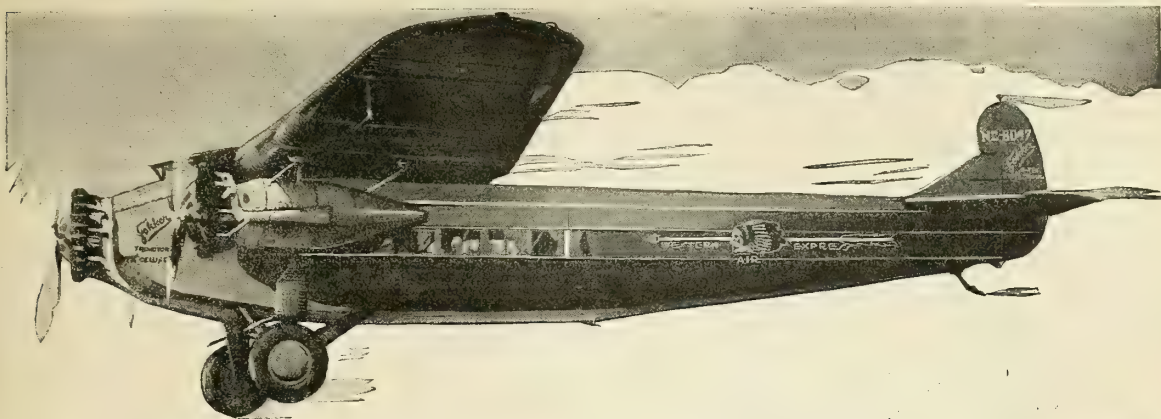
Duralumin used in the structure is treated by a special process (known as the "Anodic" process) developed at the Royal Aircraft Establishment, Farnborough, which has been proved by experiment to give a very efficient protection.

The type of gas bag wiring is also novel. The design of this was largely governed by the parachute type of bulkhead, previously referred to, which it incorporates. Its function is to constrain the gas bags and to transmit the lift of the gas to the hull framework. The system employed is said to be more effective than were earlier designs in transmitting the lift directly to the main joints with a minimum tendency to distort the framework, while preventing surging of the gas towards one end of the ship when inclined.

The gas valves are situated on each side of the gas bags and are designed to act as combined automatic maneuvering valves; that

(Continued on next page)





## The Old Mormon Trail

Salt Lake City to Los Angeles!

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Address inquiries: NEW YORK OFFICE, 1775 BROADWAY



(Continued from preceding page)

is, they will automatically relieve the pressure in the gas bags when these bags become full, or they can be operated by the captain of the ship from the control car in such a manner as to release gas, if he so desires, even when the bags are not full. Because the possible dangers to airships from the very rapid vertical currents which occur in thunder-storms were fully appreciated, these valves were designed to deal with a much more rapid rate of rise, about 4,000 feet per minute, than was provided for in previous airships.

The large tanks each hold 224 gallons of fuel. In a few special positions, tanks of half this size are fitted. The fuel from any of the tanks can be run down into special pressure tanks from whence it can be blown by compressed air to any part of the ship. This is a new feature in airships and is designed to facilitate the feeding of the main engines and the trimming of the ship.

Certain of the tanks are fitted with special discs and circular cutters for the purpose of rapidly emptying the contents in an emergency.

A number of tanks located on the passenger decks are intended to supply compensating weights when the full complement of passenger is not being carried, but they can also be used to increase the airship's total fuel capacity for long demonstration or reconnaissance flights without passengers. The tanks provided in the passenger space bring the total fuel capacity up to approximately 10,000 gallons, if no passengers are carried.

Provision is made to carry eight tons of water ballast in emergency bags (from which it can be quickly released) and seven tons in tanks similar to those used for the fuel. The water in these tanks can be transferred to any part of the ship by means of compressed air. It is not anticipated, however, that so much water for ballast will normally be required, and therefore, if desired, the water tanks (not bags) can be filled with fuel.

Forward of frame 3, the nose of the ship

consists of three simple flat transverse frames, numbered 0, 1 and 2 respectively and the intervening longitudinals. There is, at frame 2, a fair sized platform carrying hatches from which the trail rope and handling lines of the ship can be lowered. At frame 1 is located a closed-in drop gangway, by means of which the passengers will enter the ship from the mooring tower. Between frame 0 and the nose cap is a small cabin which carries the winches for the mooring ropes, and also connections to the main supply of electric current, water, gas, air and fuel when the ship is riding at the mooring tower. The nose cap itself consists of a tubular structure carrying a very strong spindle, to which is attached the cone used for mooring the airship to the tower. This spindle is capable of resisting a lateral load of thirty tons.

Special instruments in the control car indicate the lateral and vertical forces exerted at the mooring attachment.

The stern portion of the ship consists principally of three special frames, numbered 13, 14, and 15 respectively which carry the fins and flaps. Aft of this is a light tail piece about sixty feet long, made of conventional Zeppelin type girder work.

Each of the four fins, including its flap, has an area of approximately 2,200 square feet.

The span of each flap is about forty-four feet; and in order to assist the coxswain in the control car in the operation of these large surfaces, auxiliary Servo-motive power is provided. The machinery for this, which includes a Vickers-Jannet variable speed gear, actuated by an electric motor, is located in the bottom fin. The ship can also be operated entirely by hand from this position should there be any failure of the control cables passing through the hull to the control car.

The power units of the R-101 are Beardmore Tornado heavy oil, compression-ignition engines of the Diesel type. Originally, it was planned that both the R-100 and the R-101 should be powered with these engines, but because of difficulties and delays encountered in developing them, the builders of the

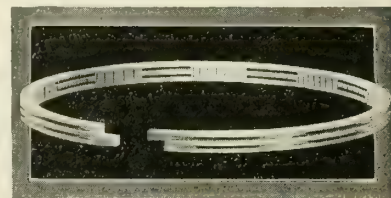
R-100 decided to use gasoline engines for the time being. The R-101, however, is fitted with the oil burning power plants.

Although it was originally expected that the Tornado would deliver 700 horsepower at 1,000 revolutions per minute, this power output has not been found possible with the engine in the present status of development; the engine actually develops 585 horsepower, with a short-period maximum of 650 horsepower. With four forward engines the R-101 has a total continuous full power of 2,340 horsepower. (As already mentioned, the fifth engine is fitted with a reverse propeller, since the intended variable-pitch propellers are not yet sufficiently perfected for use on this ship.)

## A NEW DOUBLE VENT PISTON RING

THE American Hammered Piston Ring Company of Baltimore, Maryland, recently introduced a double vent oil ring designed for use in high speed engines or where excessive oil consumption occurs.

The double vent oil ring is hammered to obtain uniform and lasting tension, and a series of parallel slots are cut through the ring to permit the draining of excessive oil



Piston ring with a series of slots

back to the crankcase. Double drainage has been combined with strength by designing the slots with rounded corners.

The ring is installed in the lowest groove on the piston except when there is a groove on the skirt of the piston, in which case it is installed in the groove directly above the piston pin.



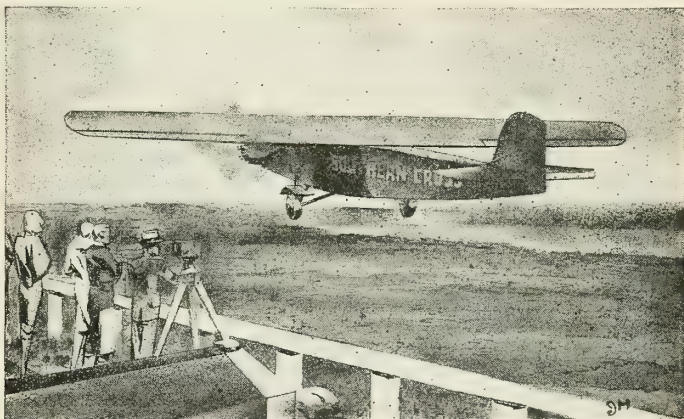
Views of the passengers' observation "deck" and dining saloon on the largest airship, the R-101



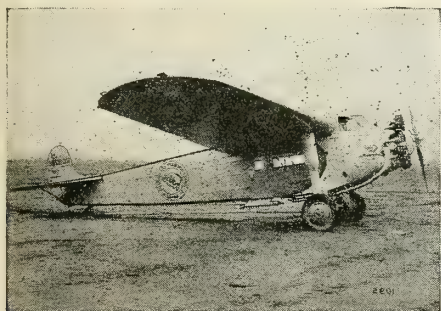
# Nearly a Mile of Bounding Jolts of Constant Tire Strain . . . AND THEN OFF TO HAWAII....AUSTRALIA!

ON May 31st, 1928, almost 16,000 pounds of plane and load gathered momentum on the runway of the Oakland Airport.

Four thousand seven hundred feet to the take-off—nearly a mile of bounding jolts and constant tire strain—but at last up and away on a flight that electrified the world! A safe landing in Hawaii — and then to Barking Sands Field.



Captain C. F. Kingsford-Smith's Silvertown equipped Fokker Monoplane the "Southern Cross" that flew to Australia in eighty-two and one half flying hours.



One of the new Fokker 6-seated passenger models demonstrated at the 1929 All American Air Craft Show at Detroit, April 6-14 on Goodrich Silvertowns.

From here Silvertowns carried the "Southern Cross" a half mile through yielding sand to another successful take-off.

Trees had to be felled by natives in Suva to make room for a landing. And on this improvised field the "Southern Cross" came to a safe stop.

Then again by thrilling hops to Sidney, Australia, the final goal of this astounding flight

was reached, in eighty-two and one half flying hours!

A significant record for Fokker monoplanes! A significant record for Goodrich Split-Second Silvertown Airplane Tires!

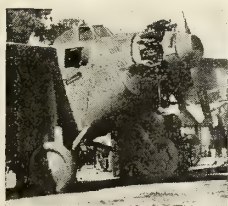
The B. F. Goodrich Rubber Co., Established 1870, Akron, Ohio, Pacific Goodrich Rubber Co., Los Angeles, Calif. In Canada: Canadian Goodrich Co., Kitchener, Ontario.

GOODRICH SPLIT-SECOND SILVERTOWNS — MANY WORLD RECORDS HAVE PROVED THESE TIRES

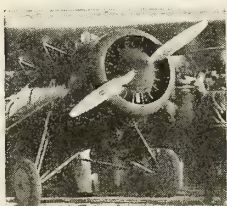
Brock and Schlee's  
Stinson



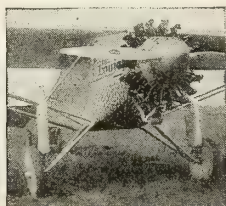
Dole Derby  
Goebel's Travel Air



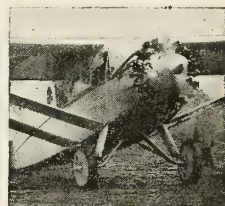
Dawn-to-Dusk  
Hawks' Lockheed



Lone Eagle  
Lindy's Ryan



Chamberlin and Levine's  
Bellanca



# Goodrich Rubber for Aviation



## CONSOLIDATED COMMODORE FLYING BOAT

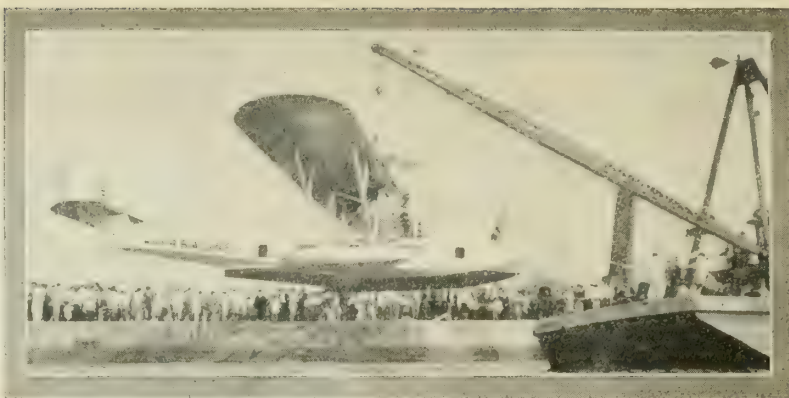
THE 32-passenger Consolidated Commodore, the *Buenos Aires*, flagship of the New York, Rio & Buenos Aires Lines, Inc., which was tested at Buffalo late in September, was flown for its first public demonstration a few days later at Miller Field, Staten Island, N. Y.

The Commodore is the largest passenger flying boat thus far built in the United States and is a commercial adaptation of the Admiral patrol plane XPY-1 delivered by the Consolidated Aircraft Corporation to the United States Naval Air Service in December, 1928. (The Navy XPY-1 was fully described in the February issue of *AERO DIGEST*.) It includes a number of improvements designed to increase the comfort and convenience of passengers. The ship will be used for regular service between New York and South American ports. It is the first of twelve similar planes which have been ordered by the transport company, the remaining eleven to be delivered at the rate of one a month.

The Commodore is powered with two Pratt and Whitney 525 horsepower Hornet engines, giving the ship a high speed of 130 miles per hour and a cruising speed of 110 miles per hour. In addition to accommodations for thirty-two passengers and a crew of three, space is provided in the Commodore for mail and express.

The interior of the plane, which was designed and furnished under the direction of Frederick J. Pike, interior decorator, incorporates several interesting features of beauty and comfort. The general appointments follow a modernistic scheme with basic tones of silver, henna and green predominating. Three cabins are provided for passengers, as well as a lavatory, buffet room and radio compartment. Two of the cabins accommodate eight passengers each; the third has two day-beds and seats for four passengers.

In order to take care of special express and mail, the *Buenos Aires* is arranged to seat twenty passengers. The other Com-



Launching of the Consolidated Commodore in the Niagara River

modores, however, will be built to accommodate the full passenger load.

The chairs and day-beds in all cabins, as well as the small adjustable tables, are of aluminum construction finished in natural color. The seats are equipped with rubber life preservers fastening by snaps which enable them to be removed in a few seconds. Cushions upholstered in various colors, are placed on top of the life preservers.

The walls of the compartment with the day-beds are covered with a Deauville rep material of pale lavender and silver. The day-beds are upholstered in turquoise damask; the seat cushions are of raspberry, gold and tan striped material. Print draperies in lemon yellow and tan are used.

Following out the plan for an individual color scheme for each cabin, the walls of the center salon are done in green and gold, a henna colored modern damask being used for the seat cushions. The third cabin has chairs upholstered in a green moire with a modernistic fabric in peach and silver for the cushions. Tan damask covers the walls.

The main passageway of the ship is carpeted with a jade green rug. Rugs in the three cabins correspond to the color scheme of each room.

The dressing room is painted in horizontal graduated lines in colored shades ranging from burnt sienna at the top to cream at the bottom. The ceiling is of turquoise blue. Special nickel fixtures were designed for this room. The lavatory is equipped with running water, wash basin, toilet, drinking water, towel racks and mirror.

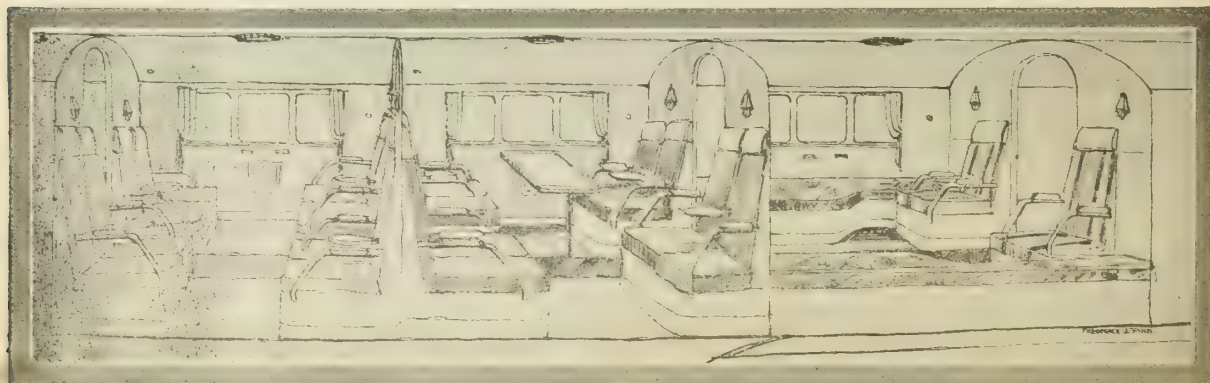
A central dome light in each cabin and over the seats small lamps finished in black and silver furnish artificial illumination. Between the seats in each of the passenger compartments, a panel holding time-tables, magazines and newspapers has been placed under the window. The adjustable tables for writing or card playing fit in slots under the window directly between the seats.

The walls of the radio room are done in silver, over which is placed a deep blue glaze. The ceiling is also decorated in silver, with coral colored streaks representing lightning.

Access to the cabin, which is 8 feet 5 inches in width with a 6-foot headway, is through a companionway in the afterbody of the ship.

The plane is of all-metal construction and is said to be very seaworthy. The flotation system consists of a single hull, having a submerged displacement of 100,000 pounds, and two outboard floats, each having a buoyancy of 3,700 pounds. The outboard floats are located 14 feet 3 inches from the center line of the main hull and provide good lateral stability in the water. According to the manufacturer, the Commodore is capable of flying with a full load on one engine and can take off with a full load in a dead calm in 45 seconds. A magnetic compass, altimeter, air speed indicator, tachometers, clock, oil temperature and pressure gauges, earth inductor compass, and a turn and bank indicator are included in the instruments with which this transport is

(Continued on next page)



Sketch showing the luxurious seating layout in the passengers' cabin of the Commodore flying boat

# Why Take a Chance?

BY

E. B. GALLAHER

Editor, Clover Business Service

Treasurer, Clover Mfg. Co.

**I** have been asked why it is safer to buy from old-established firms than from newcomers in the field. I can tell you from my own experience.

You have heard of the customer in the restaurant ordering hash, and the waiter bawling out to the cook, "Another gentleman wants to take a chance." Well, a quarter-century ago, when I started the Clover Grinding and Lapping Compound business, I had to accept such crude materials as my suppliers sent; I may have known what was wanted, but like the man in the restaurant, I bought on faith.

As the years passed, my customers demanded more accuracy—my business had grown—our purchasing power became large—we had accumulated a reserve—so, what was more natural than to begin an active study of the physical properties of our product.

A laboratory was established—competent engineers engaged—all crude materials were now being bought on rigid specifications and checked up before being used—our products improved—our trade expanded. Scientific studies of the various uses in which our products were being employed developed opportunities for still greater service.

Today we have developed new and better abrasives, which we alone control—our Compounds have a still better binder than in years gone by—an attrition machine gives us the actual work value of every batch of compound we make.

Our Papers and Cloths are all tested and approved for strength and density before they are coated; and the work value of each sheet of Color Stripe Abrasive Paper and Cloth is known to be up to standard before it is offered for sale.

In other words, *I know* today what I am selling to my friends—I *know* every article will do the work I claim for it, while at the start I was only guessing like any other beginner.

The Clover Manufacturing Company is no longer a beginner; positive knowledge concerning every item is the rule with us, as with all well-established firms—and there is the answer to your question.

If you would like to compare the latest in Grinding and Lapping Compounds or the latest developments in Sandpaper and Metal-Cutting Cloths with the ordinary run of stuff, just fill out the enclosed coupon—there is no charge, of course.



*Gallagher*

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You may send me, without obligation:

Sample Clover Grease-Mixed Grinding Compound—the kind the Government is buying.

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Green-Stripe Sandpaper.

Red-Stripe Turkish Emery Cloth—for polishing.

Yellow-Stripe Aluminous Oxide Cloth—for cutting hard metals. The universal shop abrasive.

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(Continued from preceding page)

provided. Dual control of the swing-over type is provided. Throttles, stabilizer control, fuel control, etc., are located conveniently for both pilots.

The plane was flown on its test flights by Lieut. Leigh Wade, Army 'round-the-world flier, who is chief pilot for the Consolidated company.

#### Specifications

Span overall .....	100 feet
Chord .....	11 feet, 6 inches
Length overall .....	61 feet, 9 inches
Height .....	16 feet
Wing area .....	1,110 square feet
Weight empty .....	9,500 pounds
Disposable load .....	8,000 pounds
Gross weight loaded .....	17,500 pounds
Wing loading.....	15.8 pounds per square foot
Power loading.....	15.1 pounds per horsepower
Fuel capacity .....	700 gallons
High speed .....	130 miles per hour
Cruising speed .....	110 miles per hour
Landing speed .....	55 miles per hour
Take-off (loaded; calm).....	45 seconds
Climb (initial) .....	750 feet per minute
Climb (one engine).....	100 feet per minute
Ceiling .....	17,000 feet
Cruising radius (600 gallons of fuel),	1,000 miles

## CHEVROLAIR AERO ENGINE

**T**HE Chevrolair is an air-cooled, inverted, in-line, four-cylinder, 120-horsepower aircraft engine designed by Arthur Chevrolet, formerly a manufacturer of automobile engines. Dual construction of the gasoline and oil feed control and ignition system is embodied in the Chevrolair's design to minimize a complete failure of the engine while in the air and to prevent a forced landing of the plane. The Department of Commerce has completed the tests required for a manufacturer's certificate, and plans for production of the Chevrolair in a plant at Indianapolis are under way.



The Travel Air low-wing monoplane powered with a Chevrolair engine

At the recent National Air Races at Cleveland, a Travel Air low-wing monoplane powered with a Chevrolair engine flew from Wichita, Kan., to Cleveland, where it won first place in a race for planes of its class, and third place in the only other event entered.

The engine is so constructed that after it has been assembled few adjustments will be required. There is an emergency oil flow control that traps the oil in the engine in the event of a leak in the oil line.

Dimensions of the Chevrolair have been considered with a view to increasing the pilot's vision. The head width is 12 inches, height is 29 inches, and overall width is 21 inches. Model D-4, the four-cylinder Chevrolair, weighs 325 pounds. This model has a manufacturer's rating of 120 horsepower at 2,400 revolutions per minute. Normal revolutions per minute are 2,200, and maximum are 3,000. The crankshaft is constructed in one piece of chrome nickel-molybdenum steel. The crankcase, cylinder head and pistons are made of aluminum alloy. The cylinder barrels are steel, anchored to main bearing bolts.

One patent for the Chevrolair aircraft engine has been granted by the United States Patent Office, and application is being made for 68 others. In addition to the four and six-cylinder Chevrolair engines perfected, production later is expected to include eight-

and twelve-cylinder models. Mr. Chevrolet will head the company which will produce the Chevrolair engine.

## RECENT PATENTS

**T**HE following patents of interest to readers of AERO DIGEST recently were issued from the United States Patent Office. Copies thereof may be obtained from R. E. Burnham, patent and trade-mark attorney, Continental Trust Building, Washington, D. C., at the rate of 20c. each. State number of patent and name of inventor when ordering.

Screw propeller. Spirito M. Viale and Herbert L. Towns, Coventry, England; assignors to Armstrong-Siddeley Motors Limited, Coventry, England. (No. 1,728,315.)

Flying-machine. Thomas M. Finley, St. Louis, Mo. (No. 1,728,404.)

Aerial filling device. Alexander Procoff, New York, N. Y. (No. 1,728,449.)

Aeroplane. Walford S. Rodene, Oskaloosa, Iowa. (No. 1,728,575.)

Seaplane float. Carl D. Holler, Seattle, Wash. (No. 1,728,609.)

Type of seaplane. James V. Martin, Garden City, N. Y. (No. 1,728,621.)

Aeroplane. Karl Karliczek, Detroit, Mich. (No. 1,728,683.)

Aeronautical apparatus. Adolf R. Schad, Cleburne, Tex. (No. 1,728,806.)

Airship. Michael A. Szymanski, Jacksonville, Fla. (No. 1,729,020.)

Hook for aircraft cargo-handling apparatus. Manuel Castro, Canton, Ohio. (No. 1,729,029.)

Aviation motor. Hugo Junkers, Dessau, Germany. (No. 1,729,042.)

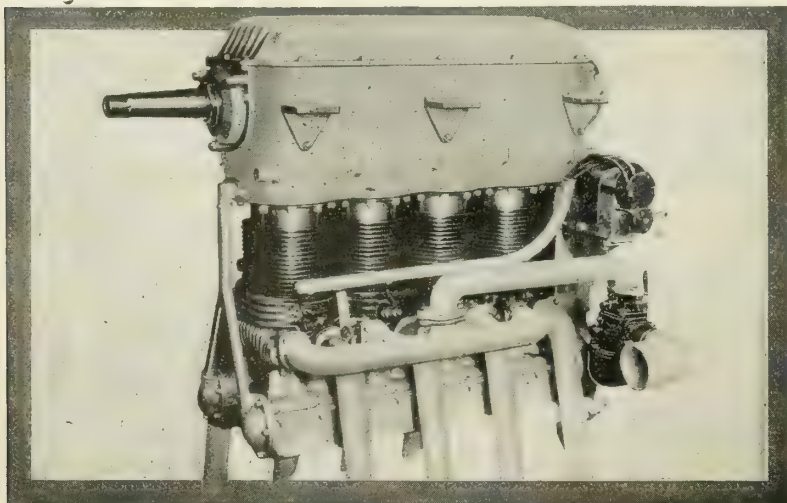
Wing surface used in aeronautics. Gustave Delage, Paris, France; assignor to Société Anonyme: Nieuport-Astra, Issy-les-Moulineaux, France. (No. 1,729,210.)

Aeroplane. Gordon E. Mounce, Portland, Oreg. (No. 1,729,354.)

Valve for airships, balloons, and the like. Hermann Naatz, Berlin-Wilmersdorf, Germany. (No. 1,729,516.)

Water-drawing apparatus for aircraft. Vincent Strafino, New York, N. Y. (No. 1,729,558.)

(Continued on next page)



The inverted four-in-line Chevrolair-120 horsepower aircraft engine

# Northeast Flying Togs



## WINDBREAKERS

No. 555—Highest grade of black horsehide, reversible, with heavy wool plaid lining, leather collar and leather cuffs. Two slash pockets and cigarette flap pocket as illustrated in our aviator's No. 600 jacket (pockets are not as above illustrated). Price, each .....\$16.50

No. 750—Boys' Model. Black horsehide, wool plaid lined reversible windbreaker. Same as No. 555, but with patch pockets, as illustrated. Price, each .....\$10.00

No. 666—Same as No. 555, but not reversible and with ZIPPER front fastener that keeps out rain and wind. Price, each .....\$20.00

No. 700—Same as No. 555, reversible, but with brown suede leather and somewhat lighter wool lining. Price, each .....\$17.50

No. 701—Same as No. 700, but with grey suede leather. Price, each .....\$15.00

No. 611—Brown suede leather windbreaker, unlined. Price, each .....\$15.00

**SELECT** any article in this advertisement, write us your size and send a check for the purchase price. We shall send it by return mail. If, upon receipt, you are not satisfied with your purchase, we shall immediately and cheerfully refund your money.



## AVIATION JACKETS

Model 600—Illustrated above. This is a handsome, snappy looking black horsehide leather windbreaker, suitable not only for flying, but also for motorcycling and general wear. It looks different from the common ordinary windbreaker—and yet there is nothing odd about it; just stylish, good-looking. The lapel and collar, made of all leather, are roll front English cut. The cuffs are of leather and are adjustable. The slash pockets are handy, comfortable and serviceable. And then, there is a little cigarette pocket with rain flap over it. The bottom is an all worsted knitting. The leather is of the finest selected horsehide fronts exclusively and will wear indefinitely without peeling. Lined with heavy wool plaid.

Note the removable leather wind-flap (an exclusive feature) which goes all the way down to the waist. It can be turned aside in warm weather so it won't be noticed or felt. And if it gets cool it is put into use. It goes all the way down to the waist and absolutely keeps the wind out—even though you may be in a sitting position and travelling at high speed. Sizes 36 to 50. Price, each ....\$18.00

No. 601—As above but in handsome mahogany horsehide leather. Each .....\$19.00

## LEATHER BREECHES

Model 335—Black horsehide breeches. Lace bottom. Fine peg shape. Perfect fitting. Two back pockets. Two slanting front pockets. Small change pocket. Strong lining, well-tailored throughout. Price .....\$16.50

## SINGLE-BREADED COAT

No. 97—Not illustrated. Black horsehide, 30 inches long, wool lined. Three pockets. Not reversible. Each .....\$12.50

Sold by all good dealers, or, if more convenient, order direct from us by mail.



## AVIATORS' DOUBLE-BREADED COAT

No. 500—Made of finest black horsehide leather, 34 inches to the knees. One-piece front, one-piece back. Handsome belt. Four pockets, two deep slash pockets and two side pockets with flaps. Warm wool lining. Knitted wristlets inside leather cuffs .....\$25.00

No. 445—As above, mahogany horsehide leather. 38 inches long, extending down to knees. Price .....\$30.00

No. 446—Aviators' Double-Breasted Coat. Same as No. 445, mahogany horsehide leather, 38 inches long, but instead of pockets as pictured above we have two large slash pockets just below the belt, one on each side. Above belt on left breast we have a large slanting map pocket, and superimposed on this map pocket a neat cigarette pocket. Price .....\$35.00



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All helmets supplied in following head sizes:

6 3/4, 6 1/2, 7, 7 1/4, 7 1/2, 7 3/4

Model 276—Navy type, chocolate gloveskin, chamois leather lined. Each .....\$5.50

Model 274—Navy type as above, but with ear puffs. Each .....\$6.50

Model 275—Army type, tan gloveskin, silk lined, with ear puffs. Each .....\$6.00

Model 300—Soft olive drab colored capeskin, soft leather lined. Each .....\$5.50

Model 301—Soft coffee colored capeskin, soft leather lined. Each .....\$5.50

Model 303—Grey suede leather shell helmet, unlined. Each .....\$3.00

## EXCELLENT HELMETS AT POPULAR PRICES

Model 180—Many students find it inconvenient to pay as much as \$5.50 for a helmet. The model 180 is an excellent, serviceable helmet at a low price. Made of soft brown lambskin, suedine lined, snug fitting all around, neatly stitched, with adjustable chin strap, and goggle straps. Each .....\$3.00

Model 181—As above, black leather ....\$3.00

Model 185—Same as No. 180, but heavy, warm warm skin lining for winter wear ....\$5.00

Model 183—As above, black leather ....\$5.00

## WHITE, GREEN OR RED HELMETS

Model 290—Made of the softest gloveskins, silk lined. Each .....\$6.00

## CLOTH HELMETS

Model 273—White soft gabardine, unlined, Each .....\$2.00

Model 260—Tan soft gabardine, unlined, Each .....\$2.00

Model 272—Olive drab cloth gabardine, serge lined. Each .....\$2.25



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Say you saw it in AERO DIGEST



(Continued from preceding page)

Aeroplane-wing construction. Albert Oaks, Cleveland, Ohio. (No. 1,729,680.)

Constant-clearance valve mechanism. Andrew V. D. Willgoos, West Hartford, Conn.; assignor to Pratt & Whitney Aircraft Co., Hartford, Conn. (No. 1,729,849.)

Steering indicator for aircraft. Guido Wunsch, Steglitz, Germany; assignor to Askania-Werke A.—G vormals Centralwerkstatt Dessau und Carl Bamberg-Friedenau, Berlin-Friedenau, Germany. (No. 1,729,850.)

Amphibian airplane. James H. Kindelberger, Santa Monica, Cal.; assignor to Douglas Aircraft Co., Los Angeles, Cal. (No. 1,729,878.)

Airship. Allen Bradford, Portland, Oreg. (No. 1,729,925.)

Wing for flying machines. Alexander Soldenhoff, Zurich, Switzerland. (No. 1,729,970.)

Cloud or fog sounding device. George P. Luckey, Dayton, Ohio. (No. 1,730,080.)

Means for utilizing centrifugal force (in an aeronautical engine). Abel L. Brownrigg, East Orange, N. J. (No. 1,730,117.)

Airplane. Alexander Smith, Pittsburgh, Pa. (No. 1,730,249.)

Aeroplane. David L. Faurote, Wanatah, Ind. (No. 1,730,414.)

Aeroplane-propeller. Walter Kuleck, Passaic, N. J. (No. 1,730,432.)

Composition for impregnating balloon-fabrics. Erich and Bruno Trenckmann, Berlin-Tempelhof, Germany; assignors to Luftschiffbau Zeppelin, G.M.B.H., Friedrichshafen, Bodensee, Germany. (No. 1,730,544.)

Cowl for propeller-hubs. Arvid Nelson, Milwaukee, Wis.; assignor to Hamilton Aero Mfg. Co., Milwaukee, Wis. (No. 1,730,742.)

Airplane. Jonathan E. Caldwell, Denver, Colo. (No. 1,730,758.)

Airplane. Olaus B. & Viding O. Jacobs, Chicago, Ill. (No. 1,730,851.)

Dirigible airship. William H. Banks, Winthrop, Mass. (No. 1,730,910.)

Safety device for aeroplanes. Arthur E. Fixel, Detroit, Mich. (No. 1,730,927.)

Automatic steering for dirigible craft. Elmer A. Sperry, Jr., Brooklyn, N. Y.; assignor to Sperry Gyroscope Company, Brooklyn, N. Y. (No. 1,730,951.)

Course-maintaining means for automatic pilots. Elmer A. Sperry, Jr., Brooklyn, N. Y.; assignor to Sperry Gyroscope Company, Brooklyn, N. Y. (No. 1,730,952.)

## STEARMAN C-4A BIPLANE

A NEW biplane of unusually clean lines is the model C-4A recently introduced by the Stearman Aircraft Company of Wichita, Kansas. This ship is powered with a nine-cylinder J-6 Wright Whirlwind engine delivering 300 horsepower, and is fitted with a N. A. C. A. cowl as standard equipment. The cowl, as applied to this ship, embodies two rather unique features. The first is that

the collector ring is placed outside the cowl at its leading edge and is so shaped as to conform with the curvature of the cowl. The other feature is that the cowl is built in quarters and set in place so that any quarter may easily be removed to facilitate inspection and servicing of the engine.

In general, the C-4A is a conventional biplane of modern design, incorporating the standard Stearman features of construction. The wings are braced externally by N-struts and streamline landing and flying wires. The ailerons are actuated by an operating strut which extends from the front beam of the lower wing to the ailerons, which are located in the upper wing only. The center section, which is also braced by N-struts, carries the fuel tank. In order to permit of accurate adjustments and easy maintenance, all hinges and bearing surfaces are bronze bushed.

Both cockpits are metal cowed as far back as the point at which the pilot's streamline head-rest terminates. A baggage compartment with a capacity of 9 cubic feet is located forward of the passenger's seat. The passenger cockpit is 38 cubic feet in size. Consequently, if the ship is used for mail or cargo flying, the combined space of the cockpit and the baggage compartment makes a total of 47 cubic feet available for this purpose. The pilot's baggage compartment is located in the rear of the pilot's cockpit. The pilot's seat, which is a parachute type, is adjustable. The forward cockpit is large and comfortable with no equipment for front seat flying. The seats in both cockpits have coiled spring cushions. Although the standard production job is not fitted with dual control, the ship may be so equipped if the purchaser desires. In both cockpits there are heaters to insure comfort in winter flying and at high altitudes.

The plane has a battery rack, but the type of battery used is determined by the purchaser's choice and is extra equipment, since

different sizes are required when landing lights are used than when not used. The company recommends a 40-ampere-hour battery for navigation lights only and a 60-ampere-hour battery for both navigation and landing lights.

The landing gear is of the split axle type, fitted with a combination steel spring and oil shock absorber unit. Tires are 32 by 6 on a 30 by 5 wheel equipped with Bendix brakes. The tread of the landing gear is eight feet. On this model, a tail wheel is used in preference to the conventional tail skid.

The plane is bonded for the use of radio. The throttle is of the Army Air Corps type. On the indirectly lighted instrument panel, in the rear cockpit only, the following instruments are mounted: air speed indicator, tachometer, compass, climb indicator, turn and bank indicator, altimeter, clock and all necessary engine instruments and fuel and oil gauges.

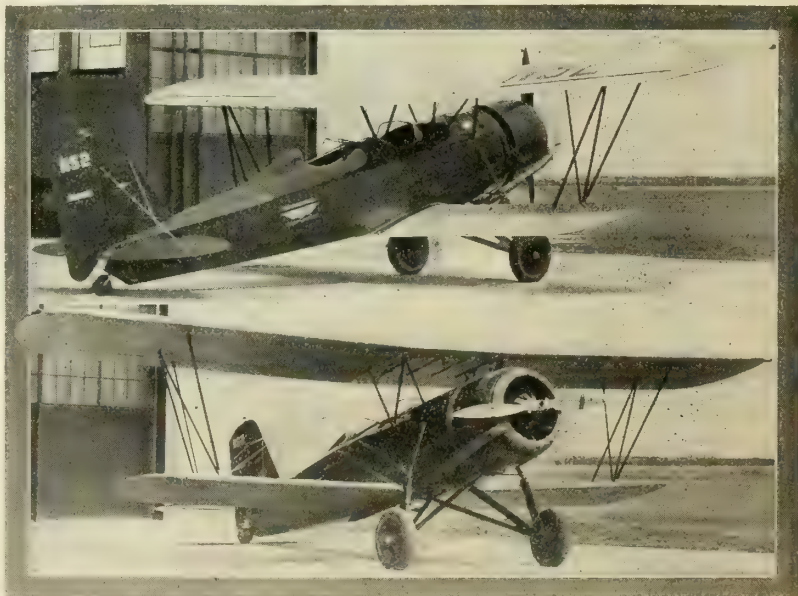
The structure of the ship is stressed for a Pratt and Whitney Wasp engine, as well as a Whirlwind 300, and with the latter power plant is known as the C-4W.

### Specifications

Span (upper wing) .....	38 feet
Wing area .....	307 square feet
Length overall .....	26 feet, 6 inches
Height .....	10 feet
Weight empty .....	2,269 pounds
Pay load .....	716 pounds
Useful load .....	1,531 pounds
Gross weight loaded .....	3,800 pounds
Gasoline capacity .....	.95 gallons
Oil capacity .....	10 gallons

### Performance

High speed .....	143 miles per hour
Cruising speed (1,700 r.p.m.),	118 miles per hour
Cruising radius .....	730 miles
Climb .....	.667 feet per minute
Service ceiling .....	12,000 feet



The 300-horsepower Wright-engined Stearman C-4A biplane

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**RYAN'S** outstanding performance is not a matter of chance. Every detail of design and construction contributes to brilliance in the air. From the installation of the 300 H. P. radial engine—in perfect relationship to the airplane's design—to the streamlining of struts, Ryan engineering has had as a primary object the achieving of speed and reliability with economy of operation.



**QUICK TAKE-OFF.** Ryans get off the ground quickly because of abundant power and low weight. Fully loaded they take off in 350 feet—and in 10 to 12 seconds' time.



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**RAPID CLIMB.** The ability of Ryan airplanes to climb 1200 feet per minute results from low weight per horsepower, high-lift wing sections and careful streamlining.



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**STABILITY** in the air is the result of Ryan's ample control areas and the inherent balance achieved by the proper grouping of the center line of thrust, the center line of resistance, the center of gravity and the center of lift.

**LONG LIFE** is obtained by building Ryan airplanes with more-than-necessary ruggedness and larger factors of safety in all wearing parts than Department of Commerce specifies. Write for catalog containing complete information.

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# GAUGING ENGINE PERFORMANCE

**D**URING a recent trip to a number of aircraft factories I was surprised to find that apparently none had made any analysis of the factors to be considered in gauging an aircraft engine. Naturally all agreed in placing reliability as of first importance but from there on a lack of agreement that should not exist is apparent. I believe that all factors exclusive of reliability should and can be evaluated with sufficient accuracy to provide a good basis for choice of engines and an excellent guide for the engine manufacturer. The factors to be considered are durability, weight per horsepower of the complete power plant (including radiators and cowling), head resistance, fuel consumption and first cost. None of these is any more important than the others, and all should be considered solely on the basis of their effect on total cost of operation per pound of pay load.

I have included durability which some will consider as almost synonymous with reliability. They are not synonymous, and engines having equal reliability may vary widely in durability. Wesley L. Smith some time ago gave figures on the comparative reliability of the Liberty and our modern engines which indicated that the Liberty engines in his service far exceeded the others from the standpoint of miles flown per forced landing, and yet I venture to say that the Liberty required more frequent overhauls than did the more modern types. Generally speaking the wear of parts does not affect reliability when knowledge of the rate of wear is available and the parts are replaced accordingly. Two other items that may be questioned are those of weight per horsepower and head resistance, for ordinarily these are very definitely associated with attainable airplane performance. Performance is not determined by power plant weight per horsepower but by total weight per horsepower or power loading as it is usually termed. An increase in power plant weight can be compensated for by a decrease in pay load or fuel load and duplicate airplane performance obtained. Head resistance is not so easily taken care of. However, if the power plant weight per effective pound of thrust is available, then head resistance would be, to a great extent, eliminated from consideration. Only in cases of airplanes where speed is much more important than climb, or the reverse, would it require consideration other than that involved in cost figures. I will refer to this again later.

## Effect of Increased Engine-Weight on Operation Cost

Leaving out consideration of variation in engine head-resistance as affected by changes in engine form I have prepared some tables in an effort to evaluate the effect of the factors I have just enumerated on the total cost of operation. Table 1 lists in the first column, weight and power data on a representative airplane having an engine weighing 2 pounds per horsepower. In the second column I have increased the specific weight

By J. H. Geisse

Vice President in Charge of Engineering, Comet Engine Corporation

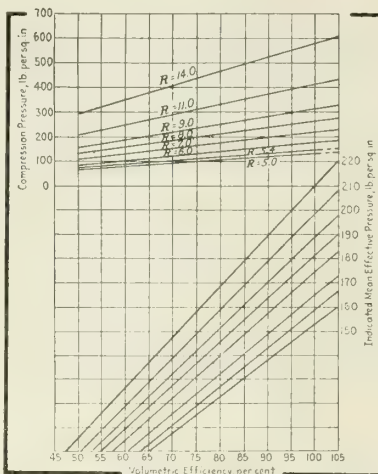


FIG. 1.—CHART SHOWING THE RELATION OF THE VOLUMETRIC EFFICIENCY TO INDICATED MEAN EFFECTIVE PRESSURE. In This Chart Which Was Developed by the Bureau of Standards, the Relations Are as Follows:  
Compression Ratio  $R = (\text{Displacement Clearance}) + 1$   
Compression Pressure  $P_2 = P_1 R^k$   
Otto-Cycle Efficiency  $e = 1 - (1/R)^{k-1}$

of the engine to 2.47 pounds and decreased the pay load to accommodate the heavier engine without changing the total weight of the airplane. To simplify and clarify the analysis of the effect of the increase in specific engine-weight, I have included a third column having the same pay load as the original design, all values in this column having been obtained by multiplying the data in the second column by the ratio of pay loads, 1340/1246, or 1.0754. The power loading is thereby maintained the same, giving identical airplane performance with the same pay load.

Table 1—Effect of Increased Engine-Weight on Operation Cost

Specific engine-weight, lb. per hp.	2.00	2.47	2.47
Power, b. hp.	200	200	215
Pay load, lb.	1,340	1,246	1,340
Engine weight, lb.	400	494	530
Fuel for 10-hr. operation, lb.	750	750	806
Airplane weight, lb.	2,000	2,000	2,150
Total weight, lb.	4,490	4,490	4,826
Total weight per brake horsepower, lb.	22.45	22.45	22.45

In Table 2 are tabulated those operation expense items that will be affected by changes in the airplane weight. In this tabulation I have figured an airplane life as 6,000 hours and an engine life as 3,000 hours. I have assumed that the cost will vary directly with weight for sake of simplicity although this is probably in error. The increased cost of operation due to the increase in specific engine-weight from 2.00 to 2.47 pounds per horsepower is \$2,561 during the life of the airplane or \$19.70 for each additional pound of engine weight. This figure is one that can be used in determining how much can be spent on reducing weight only when the reduction does not in any way affect either the endurance or the fuel economy of the engine. When either of these

factors is affected the story is entirely different.

Table 2—Operation Expense Items That Are Affected by Changes in the Specific Engine-Weight

Specific engine-weight, lb. per hp.	2.00	2.47
Costs		
Airplane	\$6,000	\$6,450
Two engines	7,200	7,750
Fuel for 6,000-hr. operation at \$0.04 per lb.	18,000	19,344
Interest on investment for 5 years at 6 per cent		
Airplane	1,800	1,935
Engine	1,080	1,162
Total	\$34,080	\$36,641

## Reduced Specific Engine-Weight and Fuel Consumption

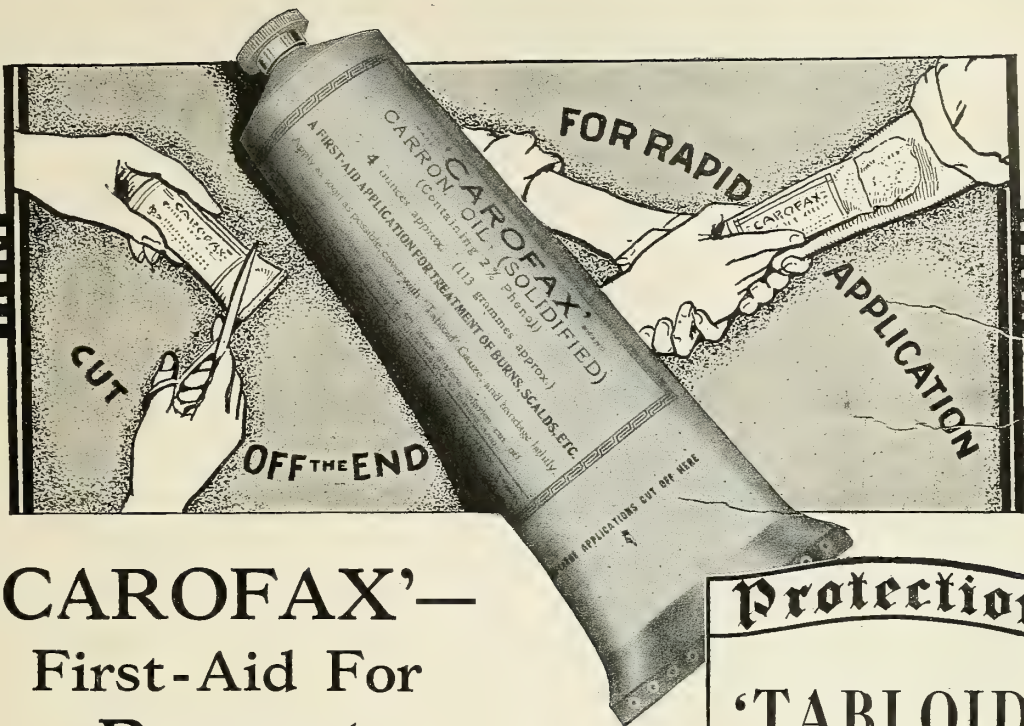
First let us consider reduction in specific weight which has a direct effect on fuel consumption. Such a reduction is obtained by securing high brake mean effective pressures either with or without a geared-up diffuser. To make any analysis we must assume a definite grade of fuel for a base. We are all well informed now as to the limitations imposed by fuels due to detonation. This limitation fixes the compression ratio that can be used for any given volumetric efficiency. In Fig. 1 I have taken the liberty of reproducing a family of curves developed by the Bureau of Standards showing the relations between volumetric efficiency, compression ratio, indicated mean effective pressure and air-cycle efficiency. These curves are based on laboratory tests. Using these relationships I have prepared Table 3 with the compression of the low-volumetric-efficiency engine increased to give the same detonation characteristics as the high volumetric-efficiency engine with a 5 to 1 ratio. The fuel consumption is also corrected in accordance with the relative air-cycle efficiencies since numerous tests have shown that they will vary in this ratio. Otherwise, Table 3 is compiled in the same manner as was Table 1.

Table 3—Engine Performance at Different Volumetric Efficiencies

Volumetric efficiency, per cent.	90.0	69.5	69.5
Compression ratio	5 to 1	6 to 1	6 to 1
Mean effective pressure			
Indicated, lb. per sq. in.	138	115	115
Brake, lb. per sq. in.	121	98	98
Air-cycle efficiency, per cent.	47.5	51.1	51.1
Specific engine-weight, lb. per hp.	2.00	2.47	2.47
Power, b. hp.	200	200	206
Weights:			
Pay load, lb.	1,340	1,300	1,340
Engine, lb.	400	494	512
Fuel for 10-hr. operation, lb.	750	696	717
Airplane, lb.	2,000	2,000	2,000
Total, lb.	4,490	4,490	4,629
Per brake horsepower, lb.	22.45	22.45	22.45

Table 3 provides the figures necessary for the compilation of costs in Table 4. The methods of calculation are identical with those used for Table 2 with the exception of increase in engine cost. In this case I have assumed no change in engine cost due to the fact that the cost of the added power required is probably more than offset by the savings attained in the use of a lower mean effective pressure. The results are striking in that they show a decrease in operating cost of \$555, in contrast to the

(Continued on next page)



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(Continued from preceding page)

former increase of \$2,561 for the same change in engine weight per horsepower but with no corresponding improvement in fuel consumption. When consideration is also given to the fact that lower mean effective pressures reduce cooling troubles and increase engine life, these figures possess added significance. The possible magnitude of the latter influence can be gauged somewhat from the following analysis of the value of added weight that increases durability.

**Table 4—Effect of Increased Specific Engine Weight on Operation Costs**

Specific engine-weight, lb. per hp.	2.00	2.47
Costs:		
Airplane.....	\$6,000	\$6,180
Two engines.....	7,200	7,200
Fuel for 6,000-hr. operation at \$0.04 per lb.....	18,000	17,210
Interest on investment for 5 years at 6 per cent:		
Airplane.....	1,800	1,855
Engine.....	1,080	1,080
Total.....	\$34,080	\$33,525

\*Based on the data given in Table 3.

### Added Weight Increases Durability of Engine

In Table 5, I have regrouped the figures of Table 2 and added figures on cost of overhauls, assuming a major overhaul every 300 hours and one top overhaul between each major overhaul. The difference in the total costs remains as before at \$2,561, since I have assumed the same overhaul costs for each case. The operating cost for the heavier engine which is directly proportional to its durability is \$14,412. To balance costs we must reduce this figure by \$2,561, bringing it down to \$11,851. This could be accomplished by an increase in durability in the ratio of \$14,412 to \$11,851 or 1.215. Expressed in percentage, this calls for an increase in durability of 21.5 per cent to compensate for a weight increase in the engine of 23.5 per cent. In other words increasing the weight of a 200-horsepower engine from 400 to 494 pounds would be justified if the time between top overhauls could be increased from 150 to 183 hours, that between major overhauls from 300 to 366 hours, and the total life from 3,000 to 3,650 hours. Such an increase does not seem to be at all unattainable when it is remembered that 94 pounds can be utilized entirely for this purpose.

**Table 5—Operation Expense Items That Are Affected by Changes in the Specific Engine-Weight Divided Between Airplane and Engine**

Specific engine-weight, lb. per hp.	2.00	2.47
Cost of Airplane.....	\$6,000	\$6,450
Interest on investment for 5 years at 6 per cent.....	1,800	1,935
Cost of fuel for 6,000-hours operation at \$0.04 per pound....	18,000	19,344
Total airplane and fuel cost..	\$25,800	\$27,729
Cost of two engines.....	\$7,200	\$7,750
Interest on investment for 5 years at 6 per cent.....	1,080	1,162
20 Major overhauls at \$250 each.	5,000	5,000
20 Top overhauls at \$25 each....	500	500
Total engine cost.....	\$13,780	\$14,412

Now let us reconsider the low mean effective pressure engine. I stated before that low mean effective pressures were conducive to a reduction in cooling problems and an in-

crease in engine life. I do not believe any one will question this statement. The increase in engine life attained by throttled operation even when the throttling is only to 90 per cent of full power is well known. Comparison of endurance tests at full throttle, and at 90 per cent of full power, nearly always present an almost unbelievable difference. Table 5 shows that for every one per cent increase in durability gained by the use of low mean effective pressures a saving of \$144.12 can be added to the initial saving of \$555, and all with an increase in airplane and engine weight of 172 pounds, an increase in power required of three per cent and a considerable reduction in the ratio of pay load to total load.

An item I have not mentioned as yet is also worthy of some note. Tests have shown in the case of water-cooled engines that the jacket loss does not increase as the compression ratio is increased. Since the power does increase this means that the heat which must be dissipated from the cylinder walls per brake horsepower is less with high compression-ratios than with low compression-ratios. Undoubtedly this also holds true with air-cooled engines. A reduction in the heat that must be dissipated from the cylinders can be turned into a reduction in engine drag which we know is an important item.

### Engine Resistance

Reverting to the question of engine resistance, the suggestion was made at the last Aeronautic Meeting that the pounds of power plant weight per pound of thrust is of much more importance than the generally

accepted figure of pounds of engine weight per brake horsepower. The former takes into consideration the resistance of the engine and its cowlings and also the cowlings weight. This, of course, would place upon the shoulders of the engine manufacturer the development of the cowlings and the choice of the propeller. However, I believe that the engine manufacturer should be in an excellent position to do this and that this change would accomplish a saving to the industry as a whole because the cowlings has to be designed more for the engine than for the airplane. The engine manufacturer would have only one cowl to develop for each engine-type and only slight modifications, if any, would be required to adapt it to different airplanes. Under the present system each airplane manufacturer using the engine has to develop his own cowl, and a point that is not to be overlooked, is the fact that in choosing a new engine he has to mount the engine, develop a cowl and determine a propeller setting before he can determine whether the new engine will give better or poorer performance than the old.

In conclusion I would like to say that this paper was written primarily to provoke a discussion that will bring out useful information. It has the further object of disseminating this information among engine purchasers in the hope that an economically sound method of gauging engines will be evolved. I believe the present methods generally used are incorrect, and as long as they remain so, the engine manufacturer must abide by them and just so long will we fail to get the utmost out of air travel.

## DH GIPSY Moth COUPE TOP

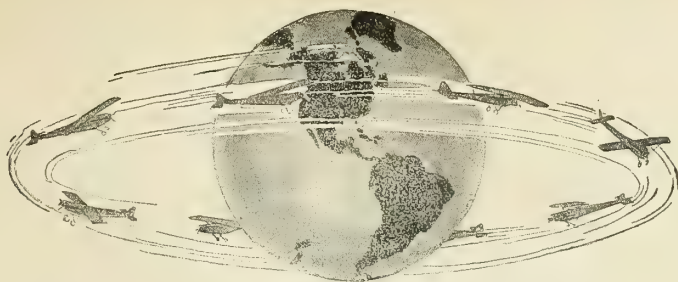
THE Moth Aircraft Corporation, Lowell, Mass., is offering a coupe top which fits all DH Gipsy Moth planes. This top is light and sturdy and it is easily put in place or taken off. When in position, it gives protection against rains and storms and cold weather. The triplex glass windows, arranged on either side of both the pilot's and passenger's cockpits, give sufficiently good visibility for student training during inclement weather, as well as for ordinary flying. The top is streamlined, giving an attractive appearance and cutting

down wind resistance. Its use does not interfere with the speed and economy of operation of the plane. In fact, by decreasing the air disturbances caused by the open cockpit, the streamline formed by the coupe top is said to add from four to six miles per hour to the plane's speed.

One of the American-built Gipsy Moth planes flown in this year's Ford Reliability Tour was provided with the new Coupe top. Its novel appearance and obvious resistance reducing properties attracted attention at every field along the route.



The Gipsy Moth provided with a detachable coupe top



## "A DISTANCE — *greater than around the globe*"

THE Pratt and Whitney Aircraft Company has played an important and substantial part in the progress of aviation.

Each twenty-four hours of the day and night its Wasp and Hornet engines furnish power to planes that fly a distance far greater than around the globe.

And each of them has justified the confidence of its pilot in the smooth, effortless efficiency and reliability of Pratt and Whitney engines.

Strong Aluminum alloys, plus creative engineering genius and exact production methods have been responsible for the outstanding performance of the Wasp and the Hornet.

Crank case, accessory drive housing, pistons, cylinder heads, diffuser section and nose and rear sections of these splendid engines are made of Aluminum Alloy, possessing the strength of steel . . . saving hundreds of pounds of dead, useless weight . . . eliminating all sluggishness and inertia from moving parts.

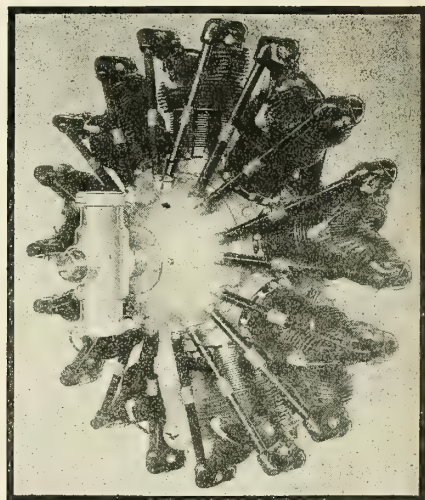
\* \* \*

The technical staff of Aluminum Company of America, creators of Aluminum strong alloys and foremost authorities in their use, invites both correspondence and personal contact with aircraft designers and builders on any matter connected with the application of Aluminum to aircraft design.

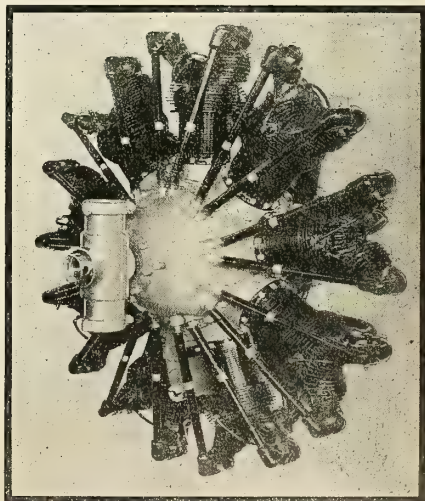
ALUMINUM COMPANY OF AMERICA  
2484 Oliver Building, Pittsburgh, Pa.  
Offices in 19 Principal American Cities



# ALUMINUM AND ITS ALLOYS FOR AIRCRAFT



Pratt and Whitney Wasp  
Weight 690 lbs.—420 H. P. at 2000 R. P. M.



Pratt and Whitney Hornet  
Weight 780 lbs.—525 H. P. at 1900 R. P. M.



# WALLACE TOUROPLANE

**T**HE Wallace Touroplane is a three-place folding wing cabin monoplane built by the Wallace Aircraft Co., Inc., a division of the American Eagle Aircraft Corp., Fairfax Airport, Kansas City. The ship is a high wing monoplane built under Approved Type Certificate No. 119. Stanley Wallace, chief engineer of the Wallace company, is the designer of the Touroplane.

The forward section of the cabin is almost entirely glass enclosed. Overhead is a skylight affording good vision above. A rear vision mirror makes it possible for the pilot to see in back and above. Windows along the sides of the cabin, all of non-shatterable glass, are arranged to open with as much ease as the windows of a motor car.

Pilot and co-pilot, or passenger, ride side-by-side. The second passenger sits on a chair in the center and to the rear of the two forward seats. Baggage room is provided back of the third seat.

Dual side-by-side controls are equipped with toe straps to permit adjustment of the braking system with the heels. A cabin heater, which may be turned on or off by touching a button with the foot, is in the forward center section of the cabin floor.

The instrument panel is illuminated for night flying and contains all of the regulation engine and flight indicator devices. Switches for landing lights are provided on the instrument panel.

Wings are of conventional design and construction. Web ribs and compression ribs are built of spruce. Spruce spars are

routed for lightness. The wings are fabric covered. The ailerons and empennage are constructed of steel tubing.

The horizontal stabilizer is adjustable through a screw and crank mechanism at the side of the pilot's seat.

The fuselage is constructed of air service specification welded steel tubing, fabric covered. The landing gear is of the split axle type, equipped with oleo shock absorbers and wheel brakes. Its tread is 6 feet 6 inches.

The power plant is the Kinmer 102 horsepower radial type air-cooled engine. This horsepower is developed at 1,850 revolutions per minute.

The wings of the Wallace may be folded. This may be done by two men in an average time of six minutes. When the wings are folded, the plane may be parked in a space of 13 by 25 feet.

Standard equipment includes: tachometer, altimeter, oil pressure gauge, oil temperature gauge, switch, choke, gas shut-off, gasoline gauge for each tank, compass, air speed indicator, fire extinguisher, safety belts, navigation lights, heater, rear view mirror, and dual side-by-side control.

## Dimensions

Span .....	37 feet
Length overall.....	24 feet
Height overall.....	8 feet
Chord .....	70 inches
Width (wings folded).....	12 feet 4 inches
Wing area .....	212 square feet
Rudder and fin area.....	38 square feet
Stabilizer and elevator area.....	14.3 square feet

Weight empty.....	1,320 pounds
Useful load.....	780 pounds
Pay load.....	425 pounds
Gross weight.....	2,100 pounds

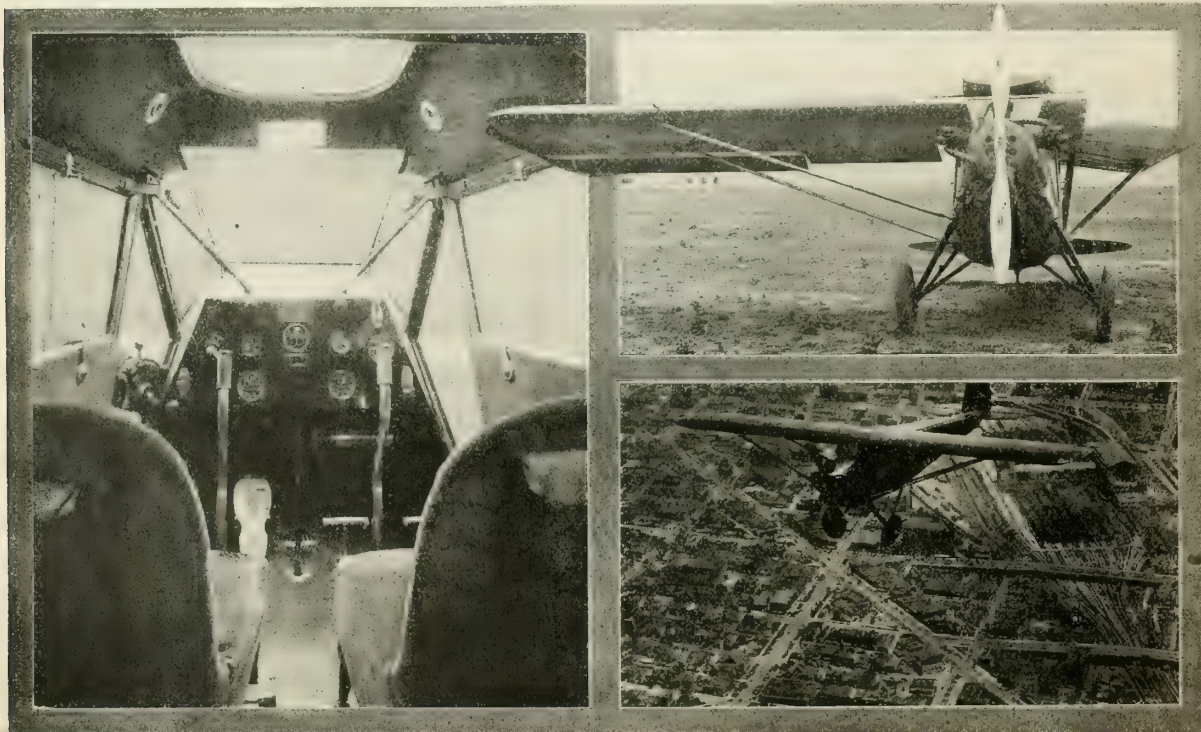
## Performance

High speed.....	115 miles per hour
Cruising speed.....	100 miles per hour
Landing speed.....	43 miles per hour
Ceiling .....	14,000 feet
Climb .....	800 feet per minute
Fuel capacity.....	32 gallons
Cruising radius.....	500 miles

## MACHINE GUN CAMERA

**T**HE Fairchild Aerial Camera Corporation a subsidiary of the Fairchild Aviation Corporation, has received a contract to develop and build a number of special machine gun cameras for the United States Army for the training of aerial gunners. These cameras, in both outward appearance, shape and weight are duplicate of the machine guns used in aerial combat. Instead of firing a bullet, however, as the trigger is pulled, they take a small photograph showing exactly where the bullet would have hit. At the same time, the hour, minute and second at which the photographic shot is fired is indicated in one corner of the film.

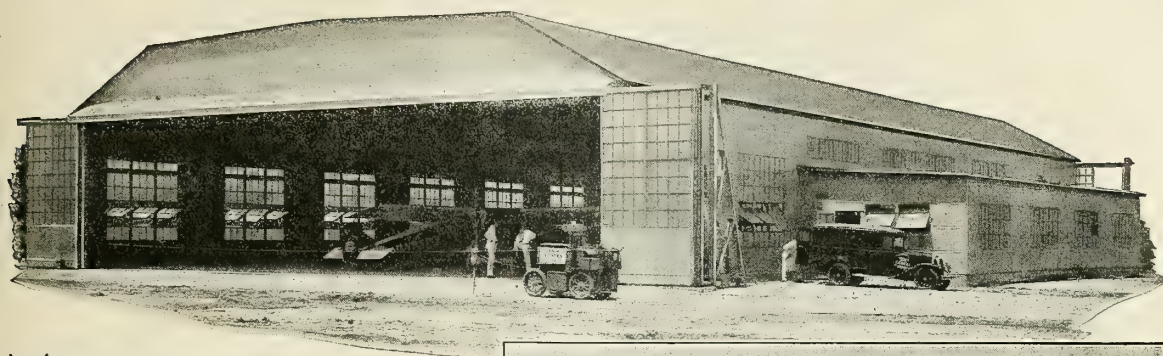
By the use of this device two aviators, after an aerial combat, by examination of the films and the time at which they are shot, can determine which one would have been shot down. It will make it possible for two fliers to engage in aerial combat without danger and to determine afterwards exactly what the effect of their fire on each other would have been.



Interior view of the Wallace Touroplane; the views above show one wing folded and the ship in flight



# TRUSCON STEEL HANGARS

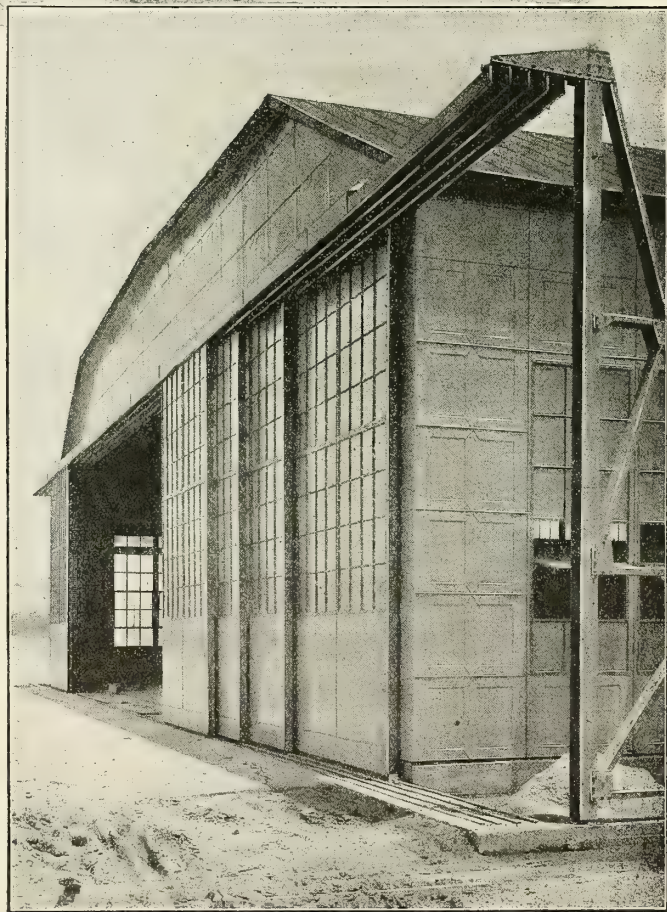


**MODERN  
DAYLIGHT  
FIREPROOF  
CLEAR FLOOR SPACE  
FULL WIDTH STEEL DOORS**

Ease in handling airplanes, fire protection and ample daylight are provided in Truscon Steel Hangars. There is a type, size and arrangement of these standardized buildings to meet exactly each individual need.

Truscon furnishes the various steel products required in any type of hangar construction. Truscon Steel Hangar Doors are of distinctive design and construction to insure durability, easy operation and long service. They open the full width and are available in all sizes of Straight or Curved Track types.

Write for suggestions, literature and quotations, sent you without obligation.



*Standard Oil Company Hangar, Municipal Airport, Memphis, Tennessee  
Truscon Standardized Hangar with Airplane Hangar Doors*

**TRUSCON STEEL COMPANY, YOUNGSTOWN, OHIO**

TRUSCON STEEL COMPANY OF CANADA, LIMITED, WALKERVILLE, ONT.

Warehouses and Offices in Principal Cities

# TRUSCON HANGAR DOORS



# THE BELLANCA "PACEMAKER"

THE Bellanca Aircraft Corporation of New Castle, Delaware, recently introduced the Pacemaker, a new model of the well-known Bellanca 6-passenger cabin monoplane. In general dimensions and design it is similar to the CH 300 model, the most apparent changes in the design being in the landing gear and the flying controls.

The previous Bellanca models have been characterized for many years by a comparatively narrow tread landing gear with a floating axle suspended in rubber shock absorbers, whereas the new Pacemaker has a wide track gear fitted with oil-draulic shock absorber struts. Especial care has been taken in streamlining the new landing gear. The upper ends of the oleo shock absorber struts are attached to the extremities of small stub wings of streamline section projecting from either side of the fuselage in the line with the lower longeron. The main spar of this stub wing, a 4-inch heat-treated chromo-molybdenum steel tube to which the landing gear struts are attached, passes through the fuselage and forms the basic member for the front structure. To the ends of the same tube the well-known Bellanca lifting section struts are attached in such a manner that the stub wing and struts form practically one surface. The landing gear is fitted with Bendix wheels with internal expanding brakes which are operated directly and individually by auxiliary pedals on the rudder pedals.

As in the previous model, this ship is equipped with complete dual control; on the passenger's control both the rudder and stick are quickly detachable, which makes it possible for the Pacemaker to carry five paying passengers in addition to the pilot.

The general arrangement of the cabin and cockpit windows remains unchanged. The pilots' seats, however, are individual, with a gangway between them, instead of being a unit seat with collapsible back as in the older models. These two pilots' seats and the two individual passengers' chairs are made of steel tube framework and are strong



The Bellanca in a steep climb

and rigid. They are completely upholstered. The rear cabin seat for two passengers is built-in and deeply upholstered. The entire upholstery in the cabin is carried out in a new Chase Velmo material, a fabric which was selected for its durability and appearance. Standard colors are two tones of gray, the lower part being comparatively dark and the upper part very light. This combination, together with the skylight window in the top of the cabin, through which the pilot can look backward and upward, makes the cabin light and cheerful.

The flying controls have been re-designed; the leverages have been changed and a number of pulleys in the system have been eliminated, with the result that the control of the rudder has been very much lightened. This new rudder control is now completely coordinated with the aileron control obtained by the use of the slot balanced ailerons.

Among other details, a number of the more complicated steel fittings have now been replaced by high tensile heat-treated aluminum alloy and bronze alloy castings, and all the control bearings have been fitted with alemite lubrication. The foot pedals are covered with corrugated rubber which adds both to the appearance and comfort. The adjustable triangular side shields on the windshield and the combination of these with the large slid-

ing side windows, which were on the previous Bellancas, have been retained in the Pacemaker. The stub wing previously referred to is reinforced so as to provide a step; the cockpit windows of the Bellanca are sufficiently large to permit pilots and mechanics to enter and leave the ship through the windows. This is particularly useful when the ship is equipped as a seaplane because it enables the mechanic to get onto the front part of the floats to fend off from a dock or boat.

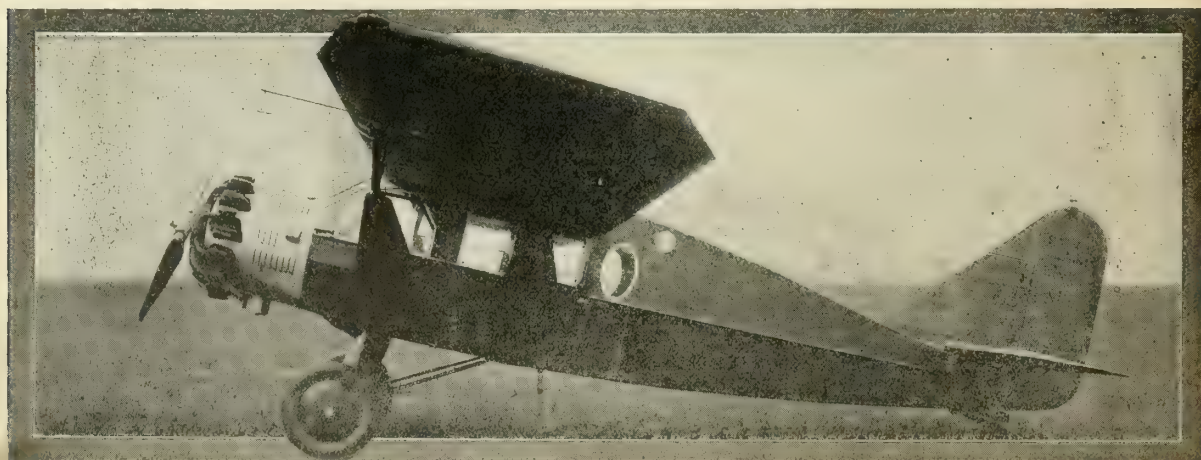
A further point of convenience for the passengers is the fact that the lower part of the door is so hinged that the door can be opened fully instead of being restricted by the lift strut. The upper part of the door is reinforced and a catch provided on the wing to hold the door open when desired. The doors and the window opposite are fitted with sliding panes to provide ventilation. Behind the cabin is a baggage compartment which extends under the built-in rear seat and has a capacity of 12 cubic feet. Access is provided, not only through a door in the side of the ship but also from the cabin, where the hinged back of the rear seat opens to the luggage space.

The operating mechanism for adjusting the stabilizer has also been completely re-designed. It is now operated by a chain and sprockets instead of a cable and drum.

The power unit is a nine-cylinder Wright Whirlwind 300. The Bellanca company was one of the first manufacturers to work out an installation for the J-6 engine. After a satisfactory method of cooling the oil was developed by the installation of cooling tubes in the oil tank and scoops to force the air through these pipes, no difficulties have been experienced. During demonstrations recently made with a Bellanca in Phoenix, Arizona, at a ground temperature of 105 degrees, the oil temperature, even after a climb with full load from the ground to 2,500 feet, did not exceed 170 degrees.

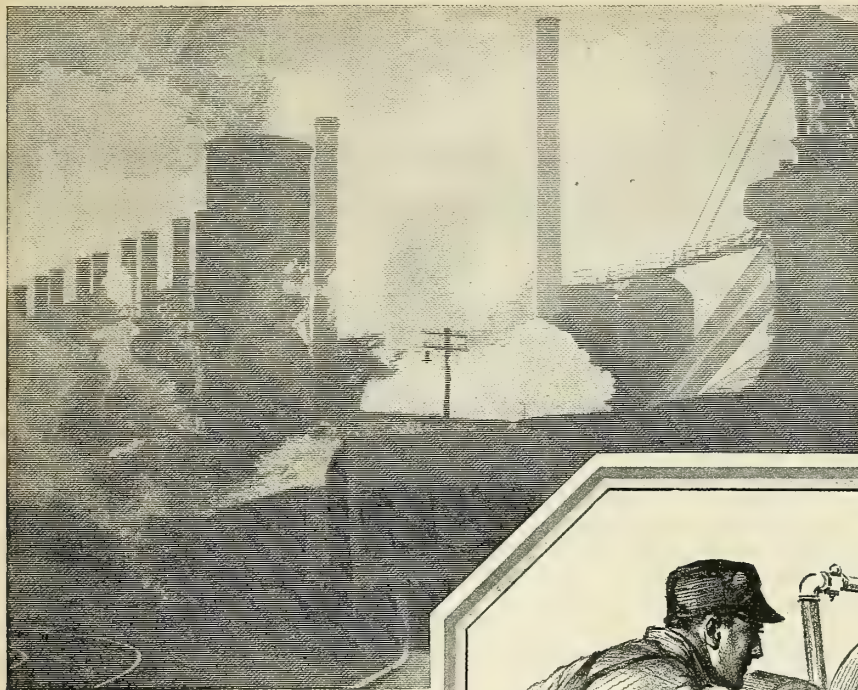
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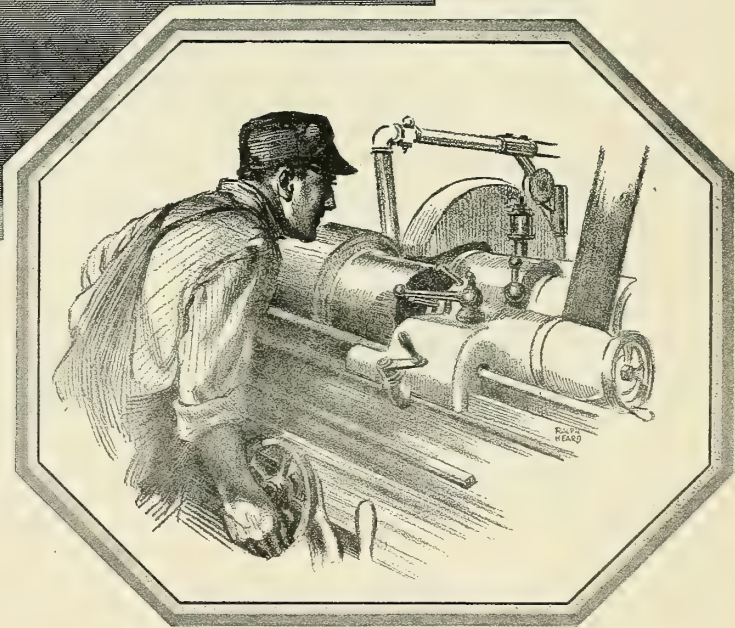


The structural strength of the Bellanca Pacemaker is 12 per cent greater than Department of Commerce requirements





# *Grinding and the Steel Industry*



**A** SURPRISING number of manufactories are dependent to a great extent upon the steel industry. The steel industry in a large measure is dependent upon grinding, upon the modern grinding machines and grinding wheels. Hundreds of tons of Norton abrasives in the form of grinding wheels are employed in the finishing of billets and castings. Grinding has made practicable the working of manganese and many other steel alloys, opening up a wider field for hard, tough metals.

Thus grinding is contributing to this great industry—this key industry.

**Norton Company, Worcester, Massachusetts**

Bauxite Plant—Bauxite, Arkansas      Abrasive Plants—Niagara Falls, N. Y., and Chippawa, Ont.  
Grinding Wheel Plants—Worcester, Mass.; Hamilton, Ont.; La Courneuve, France;  
Wesseling, Germany

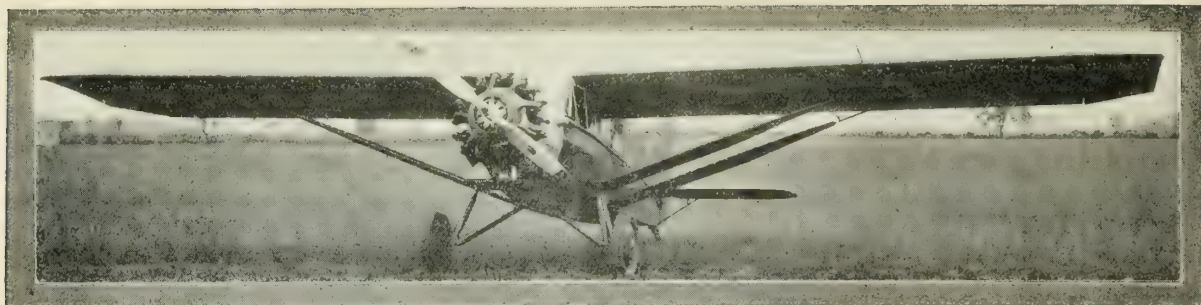
# NORTON

Grinding Wheels  
Grinding Machines



Refractories—Floor  
and Stair Tiles





The new type landing gear is shown in this view of the Bellanca Pacemaker monoplane

(Continued from preceding page)

engine and the accessories, the cowl fitted in that section is of the automobile lift-up type with two spring catches on either side and hinged at the extreme top and at the top of the side panels. All the cowl is reinforced at the edges; and the grommets, used in the bottom pan and in the fixed parts of the cowl, are made from heavy wall copper tubing. The safety pins used for fastening are also exceptionally strong.

The design of the Bellanca wing, with the special wing section developed by Giuseppe M. Bellanca, has been retained, as has also the steel fuselage structure, which was specially designed to avoid any possibility of weaving or deflection in the cabin section. The bracing of the rear of the fuselage and the internal bracing of the wings is all carried out with square section swaged rods. Under the load factors required by the Department of Commerce regulations, the Pacemaker is sufficiently strong for a total loaded weight of 4,600 pounds; actually the fully loaded weight with full tanks (85 gallons), pilot, five passengers and 210 pounds of

baggage is 4,050 pounds, the structural strength being therefore about 12 per cent in excess of the requirements. On a recent factory test of the first new model Pacemaker in order to demonstrate the structural strength of the ship, George Haldeman performed fifty-one loops in succession. The performance is the same as that of the CH 300—high speed 145 miles per hour, cruising speed 122 miles per hour, climb with full load 1,150 feet per minute, service ceiling 19,000 feet.

As regards flying qualities, the Pacemaker retains those for which the CH and the CH 300 are well-known. The lateral control is said to be effective far below the stalling point and permits the plane to be stalled with little danger of spinning or falling off on a wing. The new landing gear, with its long travel on oil and springs, permits full use to be made of this characteristic in making slow landings. The fact that the landing gear has been raised to provide greater propeller clearance and a better angle of the ship on the ground has been found to make slower landings possible.

## BINKS LIQUID SPRAY

THE Binks Manufacturing Company, Chicago, is now producing an all-purpose utility spray painting and finishing outfit, known as the Binks New Hurley Unit.

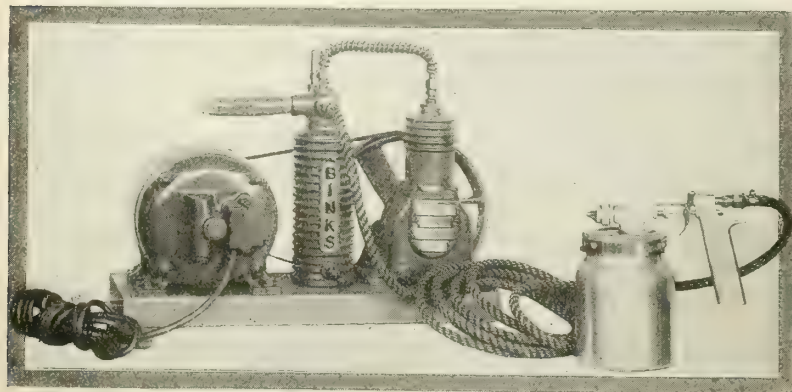
This outfit is being manufactured on a large production basis for general utility work such as touching up, refinishing, repainting, and lacquering practically any product within an organization.

It is a complete unit equipped with a full

size quart all-metal container and a pressure cup spray gun supplying an atomized flat spray four inches in width.

The air compressor unit is belt driven and connected to a one-quarter horsepower General Electric motor. This unit has a capacity of 2.16 cubic feet of air per minute.

A rib cast iron air container is mounted between the motor and the compressor on a pressed metal base, all of which is mounted on rubber feet. The cylinder and base are cast in block of grey iron.



The all-purpose Binks New Hurley painting and finishing unit

## AERO PISTOL FIRE EXTINGUISHER

AIRCRAFT SAFETY DEVICES, INC., Cleveland, Ohio, recently introduced to the trade its first safety device, the Aero Pistol Type Fire Extinguisher.

This piece of equipment is a one-hand operating fire extinguisher, one-quart size. Mounted in a jar-proof bracket, the discharge orifice nozzle fits into the fluted end of flexible tubing having three discharge outlets, one to the carburetor, one into the draft stream at the front of the engine, and one to the manifold. It is thus possible for the pilot to discharge the contents into the engine compartment with one hand, without removing the extinguisher from the bracket.



Fire extinguisher built like a pistol

The extinguisher can readily be removed from its bracket and instantly discharged with one hand in case of fire in any other part of the ship or hangar.

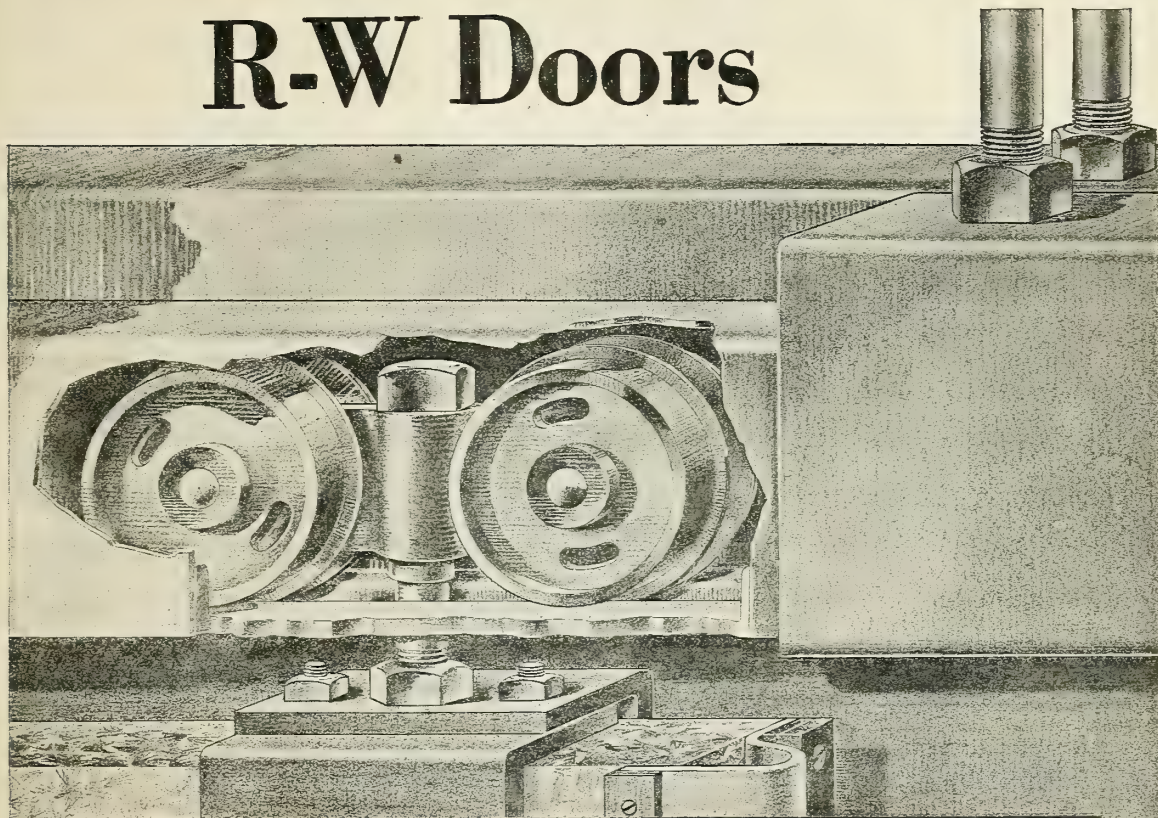
The fluid used is Aero Fluid having a carbon tetrachloride base, compounded as the result of experiments to find the fluid having an effective fire smothering gas content when discharged into flame. The gasified stream expands 3,600 times on contact with heat and is a non-conductor of electricity.

The propelling force is carbon dioxide in capsules under pressure, sufficiently strong to throw a stream 35 feet.

The Aero Pistol Type Fire Extinguisher is light in weight and simple in construction. The few working parts are out of the fluid and cannot jam, stick or corrode. Metals are used that resist corrosion. All exterior parts are cadmium plated. The device operates like a pistol, by pulling the trigger.



# Sturdy, easy-operating R-W Doors



## Doors — *most important* hangar equipment

You want the sturdiest, easiest-operating hangar doors . . . at a cost in keeping with such service.

R-W doors slide noiselessly around the corner *inside* the hangar. They withstand severe treatment for years, provide every convenience plus economy and safety.

Regardless of the height and width of the opening, any doorway problem can be

solved with R-W equipment . . . tin clad, sheet steel or Super-Way mill type doors . . . overhead trolley track or floor track, hangers, weatherstrip, bolts and hinges. Richards-Wilcox shoulders responsibility for the complete installation.

Do not hesitate to call one of our branches for free consultation with an R-W engineer, just as you call upon specialists in other phases of your business.

### Richards-Wilcox Mfg. Co.

*A Hanger for any Door that Slides*

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Boston Philadelphia Cleveland Cincinnati Indianapolis St. Louis New Orleans Des Moines  
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## NEW STANDARD PLANES

**T**HE New Standard training plane has been designed and built by the New Standard Aircraft Corporation of Paterson, N. J., to meet the requirements of student instruction. Among the features embodied in the construction is a five-place open cockpit which seats four students forward in a compartment under the upper wing. The pilot instructor's cockpit is placed toward the rear and divided from the students' compartment by the instrument board partition. Seating arrangements have been made to allow an unobstructed view to the pilot and students.

Production of the New Standard is under way with the Kinner engine installed under Approved Type Certificate No. 216. The ship has been flight tested with the Dayton Bear engine, and the New Standard company plans production of the training plane equipped with either the Kinner or Dayton Bear engine when the Approved Type Certificate covering the plane with the Dayton Bear engine is issued.

The ship is designed to meet hard usage and to handle easily in the air. It gets off the ground quickly and lands slowly. Test flights have shown a high factor of maneuverability.

The landing gear is of chrome-molybdenum steel tubing, streamlined with balsawood and equipped with the V type of shock absorber. The fuselage is of open section duralumin, and joints are riveted and bolted. It is equipped with a wide step on both sides for the use of pilot and students when entering or leaving the cockpit.

According to the New Standard company, the ship will not fall into an involuntary spin and when spun by the pilot comes out

in half a turn. The wings have a  $32\frac{1}{2}$ -inch sagger, designed with the purpose of permitting an increase in the angle of attack of over five degrees above the maximum lift before the stalling point. The downwash from the upper wing causes the lower wing to retain maximum lift at a slightly higher angle of attack. When the upper wing is in stalled position, the lower wing thus retains sufficient lift to cause the nose of the ship to drop slowly and pull the plane into a gentle glide. The large wing stagger of the New Standard training plane is also intended to furnish positive aileron control at stalling speed, similar to the effect obtained by the use of the slotted wing.

## GENERAL ELECTRIC FUEL GAUGE

**A** NEW gasoline gauge for aircraft recently was introduced by the General Electric Company. It is electrically operated and is said to give accurate readings under practically every condition of normal flight. Its operation depends on the hydrostatic head (pressure) of the gasoline to be measured. There are no moving parts except the needle of the indicating instrument and the switch.

Essentially the gauge is an electrically operated, remote indicating, pressure balance, the electric energy for which is supplied by the storage battery, dry-cell battery or electric generator with which the aircraft is equipped. A complete installation consists of one or more pressure balance units, a remote indicating instrument (actually a milli-ammeter calibrated in gallons) having as many scales as there are separate tanks to be measured, and a hand-operated,

Specifications	
Span .....	30 feet
Length .....	25 feet 9 inches
Height .....	9 feet
Wing area (including ailerons) .....	245 square feet
Wing loading.....	6.6 pounds per square foot
Weight empty .....	1,075 pounds
Gross weight loaded.....	1,610 pounds
Landing gear tread.....	6.5 feet

Performance	
High speed .....	95 miles per hour
Cruising speed .....	75 miles per hour
Landing speed .....	38-40 miles per hour
Rate of climb.....	750 feet per minute
Climb to 5,000 feet.....	7.5 minutes
Service ceiling .....	14,800 feet
Take off (time).....	7 seconds
Take off (distance).....	245 feet

normally-open tumbler switch for each pressure balance. Every tank to be measured independently of the remainder of the gasoline supply requires a separate pressure balance, but in case it is merely necessary to measure the total contents of a multi-tank ship, one pressure balance alone serves the purpose.

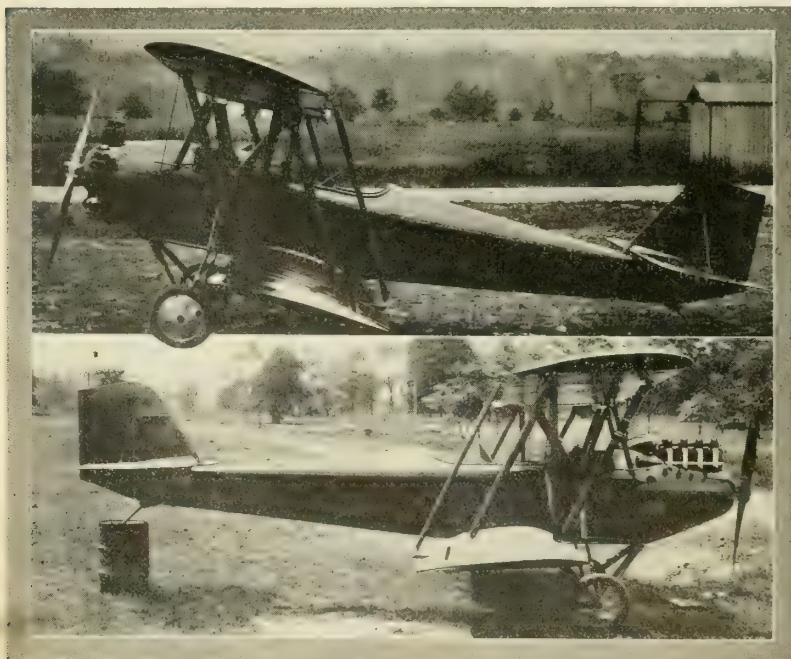
An important part of each installation is the normally-open tumbler switch. This device insures a dead circuit at all times except when the pilot wishes to read his gasoline supply, thereby preventing unnecessary consumption of electric energy and overcoming any chance of fire from broken wiring in the event of a crash.

The standard method of installing the pressure balances is to thread them into reinforcing plates welded to the under sides of the tanks. If, however, one-unit systems are used in multi-tank ships, the single pressure balance is usually located at some point near the union of the various feeder pipe lines. The indicating instrument and each tumbler switch are mounted on the pilot's instrument panel. To complete the circuit, a length of armored twin conductor wiring is run between pressure balances, tumbler switches, the indicating instrument and the electric supply.

Each pressure balance weighs approximately two pounds net, a single indicating instrument weighs five and one-half ounces, a tumbler switch weighs one ounce and the twin conductor wiring weighs about 0.32 ounces per foot. Thus an ordinary one-unit installation weighs less than three pounds complete.

## PORTABLE GRINDER

**T**HE Black and Decker Manufacturing Company of Towson, Maryland, recently introduced a new 6-inch Ball Bearing Portable Electric Bench Grinder. Black & Decker, engineers, developed this machine to meet the demand for a ball bearing grinder within the price range of the 6-inch and 8-inch sleeve bearing tools. The anti-friction bearings make it easy to maintain wheel speed under load.

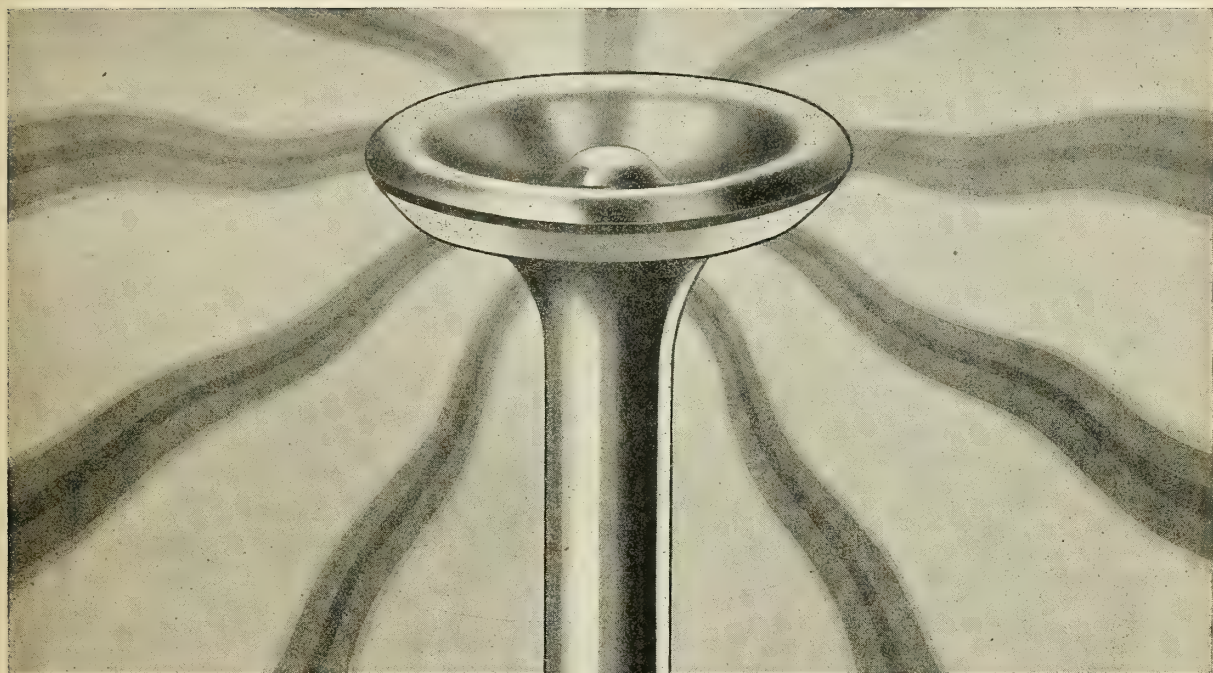


New Standard Training planes with Kinner and Dayton Bear engines



# UNBROKEN RECORDS

## *of Endurance*



*Original Equipment in 95% of*

*American-Built Aero Motors*

Forged and tempered by intricate heat treatment processes, Thompson Valves possess inherent resistance to warping, scaling and pitting under terrific engine temperatures.

They insure *perfect contact* with the valve-seat—seal the cylinders against power loss from escaping gases.

That is why Thompson Valves have been chosen to play a vital part in every important American endurance flight since 1924.

THOMPSON PRODUCTS, INCORPORATED

General Offices: Cleveland, Ohio, U. S. A.

Factories: CLEVELAND and DETROIT

## Thompson Valves





# Hodkinson Trimotored Transport

**T**HE new Hodkinson three-engined transport, which was recently completed at Glendale, California, by the Valley Manufacturing Company, Division of Hodkinson Aircraft, is powered with three 170-horsepower Curtiss Challenger engines, seats six passengers comfortably in the cabin and has a neatly arranged and comfortable pilots' cockpit.

This model has many unusual features. It is a sesquiplane, with the outboard engines mounted on the small lower wings; the cabane struts form an inverted "V" and are faired in with the fuselage structure, affording good rear vision for the pilot. The pilot's cockpit has a door on each side and is not completely enclosed as in the conventional cabin airplane. There is a door between the cabin and the pilot's cockpit, thus providing another entrance to the cockpit.

A great amount of thought has been given to the pilots' cockpit, especially in the arrangement of the surface controls, engine controls and fuel system controls, for ease of operation, and in the convenient grouping of instruments.

The controls are dual, provision being made for the removal of one set in case it is desired to carry an extra passenger in the pilot's cockpit. The control columns are of the Dep, or wheel, type with an auxiliary column connected to the main pilot's column by a compression tube and roller chain. Roebbling control wires are used throughout, as are Westinghouse Micarta control pulleys with special machined ball bearing axis.

The engine controls are centrally located within easy reach of either pilot, and the fuel system controls are grouped immediately forward of the pilot's seat. An auxiliary instrument board on the left hand side of the pilot's seat carries three-way dis-

tributing valves for a Navy type Phister compression fire extinguisher, primer and Heywood starter and starting lever. Moreover, each engine, as well as the cabin, is equipped with a Shur-Ex fire extinguisher.

The following Pioneer instruments are installed on the instrument board: one fuel pressure gauge; three oil pressure gauges; three oil temperature gauges, tachometer for nose engine, air speed indicator, bank and turn indicator, altimeter, ammeter, volt meter, clock, and Heywood starter pressure gauge. The switches for navigation lights,

each side of the cabin. The cabin is finished and upholstered in Laidlaw cloth, in a manner similar to the highest grade motor cars. Dry-Zero is used as insulation against noise and variations in temperature. A toilet compartment with full head room is provided just to the rear of the cabin. Adjoining this is a baggage compartment. The baggage compartment is accessible through an outside door only.

The highest class materials, accessories and workmanship prevail throughout. The fuselage is of chrome-molybdenum steel tubing, using Warren Truss bracing back to the rear of the cabin and wire bracing aft of the cabin.

The stabilizer and fin are built of chrome-molybdenum steel tubing; the rudder, elevator and ailerons are all of dural construction. The stabilizer is adjustable in flight from the pilot's cockpit.

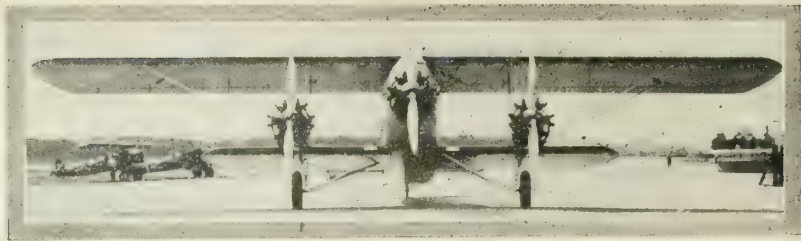
The baggage, toilet, cabin and pilot's floors are of dural construction.

The wings, both upper and lower, are of conventional spruce construction with tie rod drag bracing and covered with Flightex fabric, with the exception of the engine sections on the lower wings which have metal covers. The lower wing has routed beams, whereas those in the upper wing are box beams with spruce caps and two-ply spruce sides. All wing ribs are of conventional truss type construction. The ailerons are located only on the upper wings and are the Friese type. Each upper wing carries an eighty-gallon fuel tank; sight gauges located back of and above the pilot's head are provided and are read from the rear view mirror previously mentioned. A five-gallon oil tank is provided for each engine. The wing bracing consists of streamline duralumin struts and streamline tie rods. All plywood used in the construction of the ship is Haskelite.

The landing gear has a tread of 16 feet 6 inches and is equipped with Gruss shock absorber struts and 36 by 8 Bendix wheels and brakes. The brakes are operated from the rudder pedals. The tail wheel unit is equipped with a 14 by 3 inch wheel and tire and a Gruss shock absorber strut. Goodyear tires are used.

This sesquiplane wing type of construction permits not only of good stability, but also of an advantageous mounting of the outboard engines. The arrangement in this airplane has been worked out so that the outboard propeller discs are below the upper wing and the plane of rotation of the outboard propellers is forward of the pilot's cockpit and all surface controls. Three Hamilton propellers are fitted.

(Continued on next page)



The Hodkinson taking off

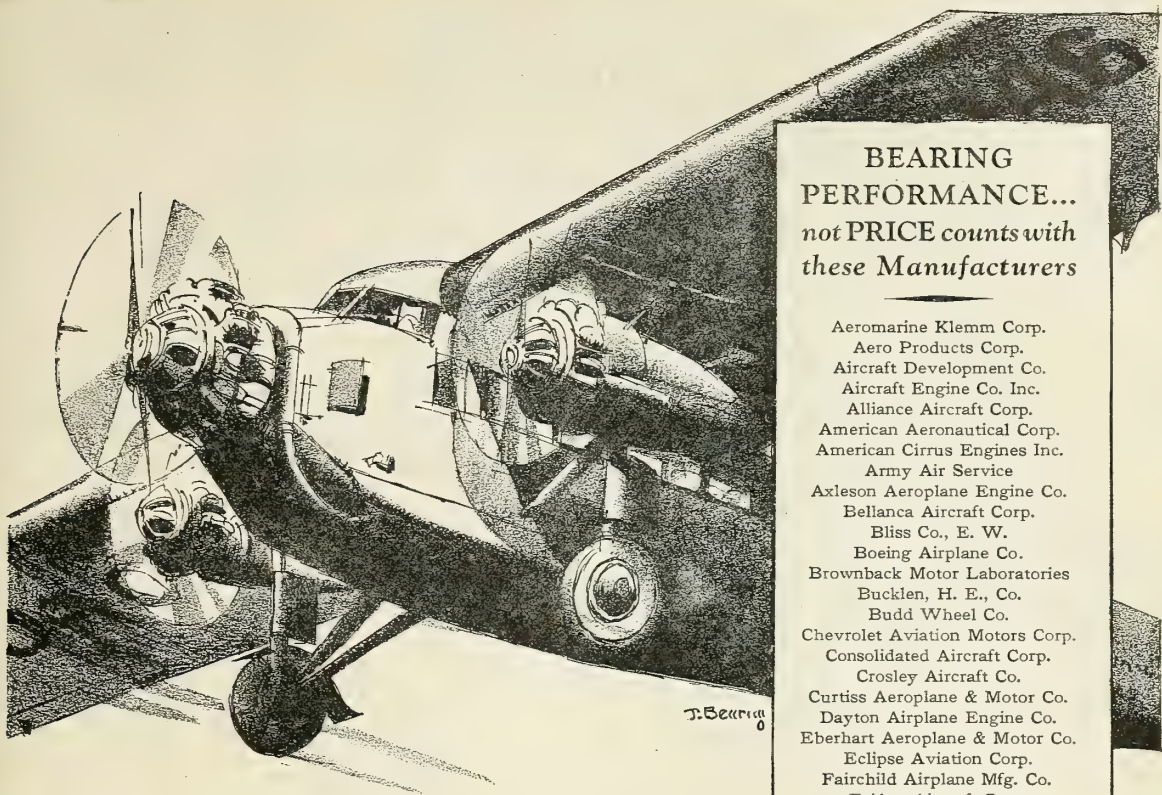
cabin lights and instrument board lights are mounted on the left hand side of the board.

A reverse card compass is mounted on the center line of the airplane just above and to the rear of the pilot's head, and is read from a rear view mirror which is mounted above the instrument board.

The cabin is unusually commodious and has a large door on each side immediately forward of the rear cabin seats. All passenger seats are adjustable to permit of changes in position and afford maximum comfort. Safety belts are provided throughout. There is a full-view window of Pittsburgh DuPont non-shatterable glass on



The Hodkinson three-engined 510 h.p. six-passenger sesquiplane



# What's a mere matter of PRICE when you're a mile or two UP

IN this new industry of the skies where progress depends upon unfailing performance and dependability and where low price is not a lure, "the highest priced bearing in the world" is used by practically all aircraft and aircraft equip-

ment manufacturers...Aircraft manufacturers can't afford to take a chance on anti-friction bearings. Neither can manufacturers in other fields. They merely *think* they can.

Nothing is apt to cost so much as a bearing that cost so little.



**SKF** INDUSTRIES, INC., 40 East 34th St., New York, N.Y.

# SKF

"THE HIGHEST PRICED BEARING IN THE WORLD"

## BEARING PERFORMANCE... not PRICE counts with these Manufacturers

Aeromarine Klemm Corp.  
Aero Products Corp.  
Aircraft Development Co.  
Aircraft Engine Co. Inc.  
Alliance Aircraft Corp.  
American Aeronautical Corp.  
American Cirrus Engines Inc.  
Army Air Service  
Axleson Aeroplane Engine Co.  
Bellanca Aircraft Corp.  
Bliss Co., E. W.  
Boeing Airplane Co.  
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Bucklen, H. E., Co.  
Budd Wheel Co.  
Chevrolet Aviation Motors Corp.  
Consolidated Aircraft Corp.  
Crosley Aircraft Co.  
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Gillis Aircraft Corp.  
Goodrich Co., B. F.  
Goodyear Zeppelin Corp.  
Great Lakes Aircraft Corp.  
Guiberson Corp.  
Hamilton Metalplane Co.  
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Mercury Aircraft, Inc.  
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Moth Aircraft Corp.  
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Wright Aeronautical Corp.  
National Advisory Committee  
on Aeronautics

Practically the entire  
Aviation Industry uses  
**SKF** Bearings

2347



(Continued from preceding page)

It has been the thought of the builder to anticipate the desires of the discriminating airline operator and his public, and offer something that is really an advance in construction details, safety features and finish and appointments.

The plane has a sufficiently low power loading to insure a satisfactory cruising speed on all engines and is capable of maintaining flight on any two engines. It has a wing loading of 12.2 pounds to the square foot and landing speed of fifty m.p.h.

The general appearance of the plane is rather different from anything on the market, and with its four doors and general finish, suggests a modern type of automobile design.

The color scheme is two-toned Berryloid fuselage with yellow striping, yellow wings and tail surfaces.

The plane was constructed in its entirety by the Valley Manufacturing Company, Division of Hodkinson Aircraft, the head of which is William W. Hodkinson.

#### Specifications

Span, upper wing	.....36 feet
Span, lower wing	.....30 feet 6 inches
Length overall	.....36 feet 3 inches
Height overall	.....11 feet 10 inches
Chord, upper wing	.....96 inches
Chord, lower wing	.....70 inches
Area, upper wing	.....430 square feet
Area, lower wing	.....139 square feet
Aileron area	.....50 square feet
Fin area	.....9.5 square feet
Rudder area	.....15.4 square feet
Stabilizer area	.....30.5 square feet



Hodkinson engine mount detail

Elevator area	.....29.5 square feet
Weight empty	.....4,300 pounds
Disposable load	.....2,650 pounds
Pay load	.....1,560 pounds
Gross weight loaded	.....6,950 pounds
Wing loading	.....12.2 pounds per square foot
Power loading	.....13.6 pounds per square foot

#### Performance

High speed	.....115 miles per hour
Cruising speed	.....100 miles per hour
Landing speed	.....50 miles per hour
Climb (sea level)	.....860 feet per minute
Service ceiling	.....13,400 feet
Absolute ceiling	.....15,200 feet
Cruising range	.....500 miles

#### Specifications and Performances

Span	.....37 feet
Length overall	.....23 feet 6 inches
Height overall	.....6 feet 5 inches
Chord	.....4 feet 9 inches
Total wing area	.....175 square feet
Elevator area	.....13.8 square feet
Weight empty	.....885 pounds
Useful load	.....465 pounds
Gross weight loaded	.....1,350 pounds
Wing loading	.....7.7 lbs. per sq. ft.
Power loading	.....20.7 lbs. per h.p.
High speed	.....103 miles per hour
Cruising speed	.....80 miles per hour
Climb	.....725 feet per minute
Service ceiling	.....13,000 feet
Absolute ceiling	.....16,000 feet
Fuel consumption	.....20 miles per gallon

## THE SKYLARK

ANOTHER new airplane being produced at Wichita, Kansas, is the Watkins Skylark, a two-place open-cockpit monoplane manufactured by the Watkins Aircraft Company. This ship, a low-wing land monoplane, is powered with a 5-cylinder Le Blond radial air-cooled engine rated at 60 horsepower at 1,900 revolutions per minute.

The fuselage is of reinforced shell and steel tubing construction, fabric covered. The wings are of the conventional type—two box spars and built-up truss ribs. The wings are likewise covered with fabric.

The plane has a fuel capacity of 20 gallons and an oil capacity of 3 gallons.

## COMPRESSED GASES FUEL GRAF ZEPPELIN

AN important problem confronting the designers and operators of lighter-than-air craft is that of keeping the lift of the ship approximately constant at all times, although the weight of fuel is constantly diminished as it is consumed during the cruise. This can be accomplished by valving off part of the levitating gas, but since that is a costly and wasteful process, several methods have been found to avoid it.

In the case of the *Los Angeles*, which is helium filled and uses gasoline as fuel, the lift of the ship is kept constant by condensing the water of combustion from the exhaust gases of the engines. The *Graf Zeppelin*, however, uses hydrogen as the levitating gas because hydrogen is much more easily obtainable than helium. A gas, carried in separate balloonettes in the interior of the ship, supplies fuel for the engines. The lift of the ship is kept constant by using a fuel gas having approximately the same specific gravity as air. Thus the load is not diminished as the fuel gas is consumed.

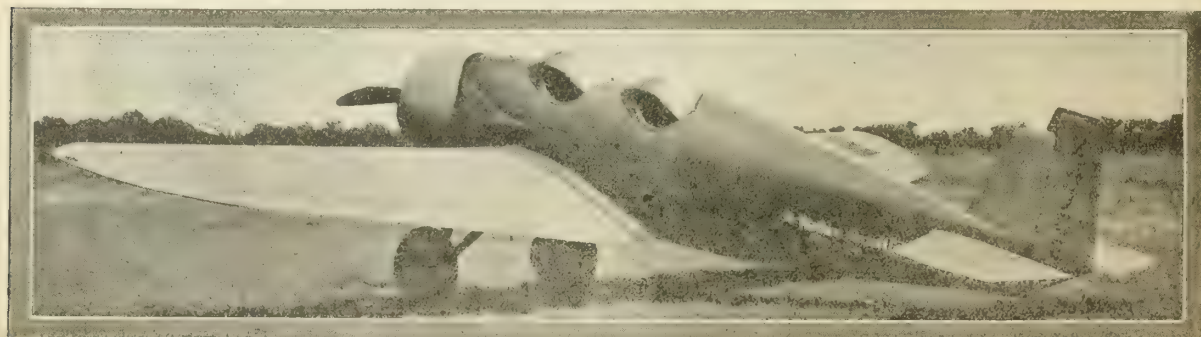
The *Graf Zeppelin* was fueled at its home port, Friedrichshafen, with Blau gas. This gas, which is produced by cracking oil, is extremely suitable inasmuch as it has about the same specific gravity as air and has a high fuel value. Since this gas is not available at other places, different arrangements had to be made at the other airports at which it was proposed to refuel on the globe-circling flight.

Chemists of The Linde Air Products Company and the Carbide and Carbon Chemicals Corporation, both units of the Union Carbide and Carbon Corporation, were consulted on the manufacture and use of fuel gases.

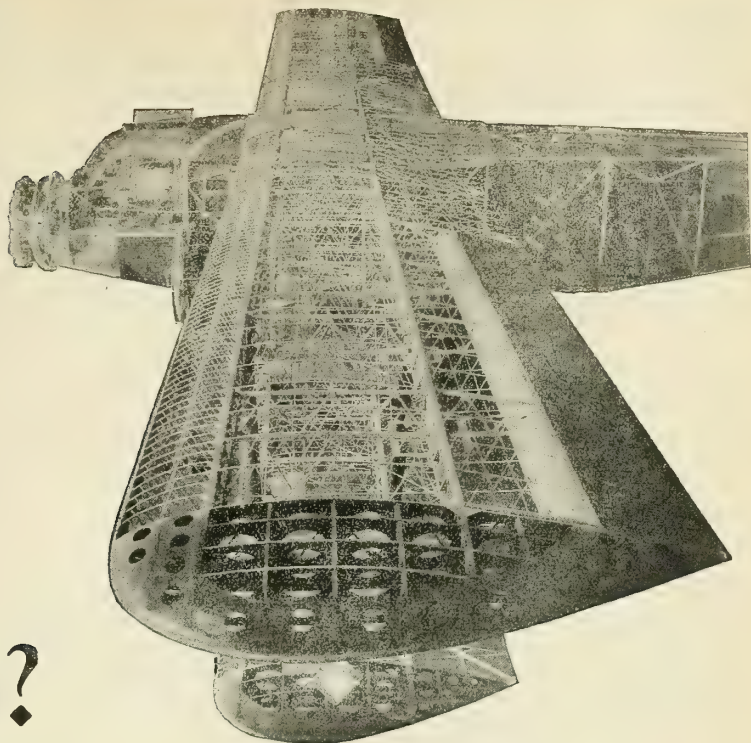
Sufficient Ethane for the first leg of the cruise, from Lakehurst to Friedrichshafen, was accordingly sent to Lakehurst, compressed into steel cylinders, from the Carbide and Carbon Chemicals Corporation plant in West Virginia. Ethane was successfully used on the first leg of the flight.

Upon its return to Friedrichshafen, the dirigible was refueled with Blau gas for the flight to Tokio.

But because of economic and scientific considerations, Pyrofax, mixed with hydrogen, was used as a fuel for the third leg of the cruise from Tokio to Los Angeles.



The low-wing Watkins Skylark monoplane powered with a 60-horsepower LeBlond engine



# Want a good tip? ..... *use* HASKELITE

**B**OTH structurally and informatively, HASKELITE is a good tip. The illustration shows a construction view of the Boeing 18-passenger transport that has attracted much attention lately. The wing tips and walls and ceilings of the cabin are HASKELITE.

Altogether, approximately 17 out of every 20 aircraft manufacturers have taken the tip to use this blood albumin glued water-resisting plywood. Practically every record breaking plane has been equipped with it.

Valuable data on the applications of HASKELITE and PLYMETL (metal-faced plywood) sent on request to engineers and builders.



**PLYWOOD**

**HASKELITE**

**PLYMETL**

**Haskelite Manufacturing Corporation**

120 South LaSalle Street, Chicago, Illinois

Railway & Power Engineering Corp., Ltd.  
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Box 333, Garden City, L. I.

California Panel & Veneer Co.

955 S. Alameda Street.

Los Angeles, Calif.

Cutter, Wood & Sanderson Co.  
222 Third St., Cambridge, Mass.

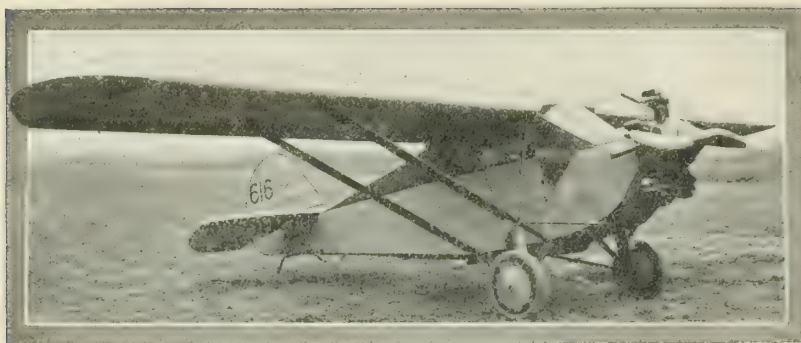


**PLYWOOD**

**HASKELITE**

**PLYMETL**





## CRUIZAIRE CABIN PLANE

**T**HE Cruizaire three-place cabin monoplane developed by the Dunn Manufacturing Company, of Clarinda, Iowa, was designed as an all-purpose enclosed ship that could safely operate from small fields. The ship was designed by Harold L. White, consulting engineer of Chicago.

The Cruizaire is an externally braced, high-wing monoplane, having a span of 37 feet, a chord of 60 inches and an overall length of 21 feet, 7 inches.

The landing gear, which has an 89-inch tread, is of the split axle type with multiple disc rubber shock absorbers. The tail skid is a four-leaf, steel spring with detachable shoe.

The landing gear and wing struts are streamlined, and the wheels are provided with discs and Zerk oilers. The rear struts are adjustable.

The power plant is a 5-cylinder Kinner K-5 radial type, which is rated by the manufacturers at 100 horsepower but which turns up 113 horsepower at 1,880 revolutions per minute. A Storey propeller is standard equipment.

Special attention has been given to reducing head resistance. A high lift wing using a U. S. A. 35A airfoil is employed.

The aluminum engine cowling is provided on both the top and sides with large hinged doors which give quick access to the rear of the motor and accessories. Louvers in the bottom of the motor compartment eject any waste oil below the ship.

The wings are of spruce, with routed I-beam spars and Warren truss type ribs. The fabric of the entire leading edge is underlaid with sheet aluminum which extends back to the front spar on both the upper and lower surfaces. Wing tips are steel tubing and ailerons are of spruce. Rudder, fin, elevator and stabilizer are of welded steel, fabric covered.

The fuselage is a Warren truss built of 1025 S.A.E. steel tubing, welded. All covering is Flightex, dope is Van Saacht, and finish is Berryloid.

In the 38-inch cabin, a very satisfactory seating arrangement has been worked out. Folding coach type, side-by-side chairs are provided for the pilot and forward passenger, or the rear seat which is the full width of the cabin may be used to carry two, leaving one chair vacant. Variable fore and

aft loads are compensated by the horizontal stabilizer which is adjustable from the pilot's seat.

A 30-gallon gasoline tank above the cabin levels the space between the wings, and a 10-quart oil tank is mounted in front of the aluminum fire wall which separates the engine and cabin compartments.

Dual side-by-side controls are standard equipment, but the right hand set may be made inoperative when so desired. From the control stick the ailerons and elevator are operated through bell cranks and steel tubing.

The rudder is connected by cables to swing pedals in the cabin. The ground may be seen beyond 30 feet of the front of the ship when in level position, and vertical "V" side windows allow a clear view of the ground almost directly underneath. Sliding panels are provided in the doors.

The instrument panel is metal, finished in Circassian Walnut and is supplied with a standard Elgin unit consisting of tachometer, altimeter, oil pressure and temperature gauges. A Cutler Hammer ignition switch gives selective control of the two Scintilla magnetos. An Imperial primer and choker provide means to assist in easy starting. The dual throttles are of the push-pull type and extend back along the cabin sides to points convenient to both front seats.

The cabin upholstery is grey fabrikoid and the detachable upholstery is leatheroid of a harmonizing color.

The weight empty is 1,100 pounds and gross weight loaded 1,800, allowing 700 pounds for passengers, fuel and oil.

The ship shows a high speed of 110 miles per hour and cruises at 95 miles per hour.

## WRIGHT ENGINE PERFORMANCE

**O**NE forced landing for every 91,200 miles flown is the average experience of pilots using Whirlwind engines, according to replies received by the Wright Aeronautical Corporation to inquiries sent to all licensed pilots in the United States. Replies were received from 302 fliers.

The records of safe flying behind Whirlwind engines made by celebrated aviators were not included in the search for the average reliability of the engine. The average of 912 hours for every forced landing represents flight in every section of the country under all conditions encountered in military, mail, commercial, and pleasure flying.

The number of flying hours reported by the pilots was equivalent to 9,298,000 miles. This distance was covered with only 102 forced landings due to engine trouble. Twelve of the 102 forced landings occurred with the obsolete J-3 and J-4 models of the engine. Nine pilots were driven to earth when heavy rainstorms drowned out their motors. Forty-four of the failures were attributed to difficulties with the valve assembly mechanism, push-rods or rocker arms. 231 pilots reported no motor failures.

## RYAN B-5 WITH FLOATS

**F**LIGHT tests on the B-5 Ryan Brougham plane equipped with pontoons were successfully completed at St. Louis recently under the supervision of inspectors from the Department of Commerce. The plane took off in 20 seconds with a light total gross weight of 3,400 pounds, and with a full load the tests showed a take-off of from 21 to 30 seconds.

The plane cruises at 110 miles per hour, with the J-6 Wright Whirlwind 300 horsepower engine turning up 1,700 revolutions per minute. A high speed of 128 miles per hour with the engine turning up 1,900 revolutions per minute was obtained with a full load. A down stream take-off was made in less than 1,500 feet with the plane fully loaded. Standard Edo pontoons and fittings are used. The regular landing gear can be replaced with the pontoons in about four hours without special equipment.



The Ryan B-5 Brougham equipped with standard Edo floats.



# *Into the land of lakes and woods* **To Save the Life of a Boy**

## **A Chapter from the Daily Log of an IRELAND AMPHIBION**

**A** YOUNG boy lay critically ill at Westport—on Lake Champlain. Too ill to be moved by usual means of transportation. So ill the services of a specialist were needed.

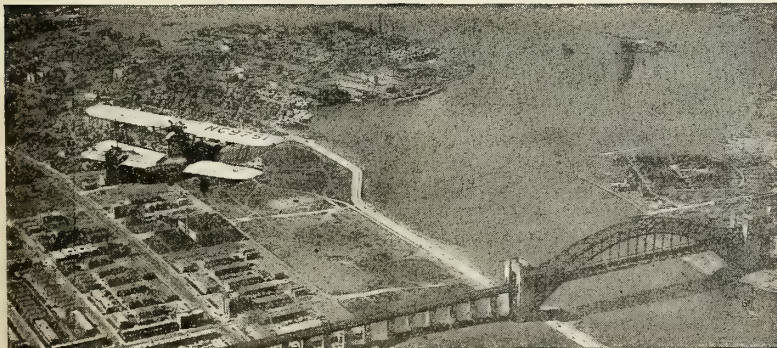
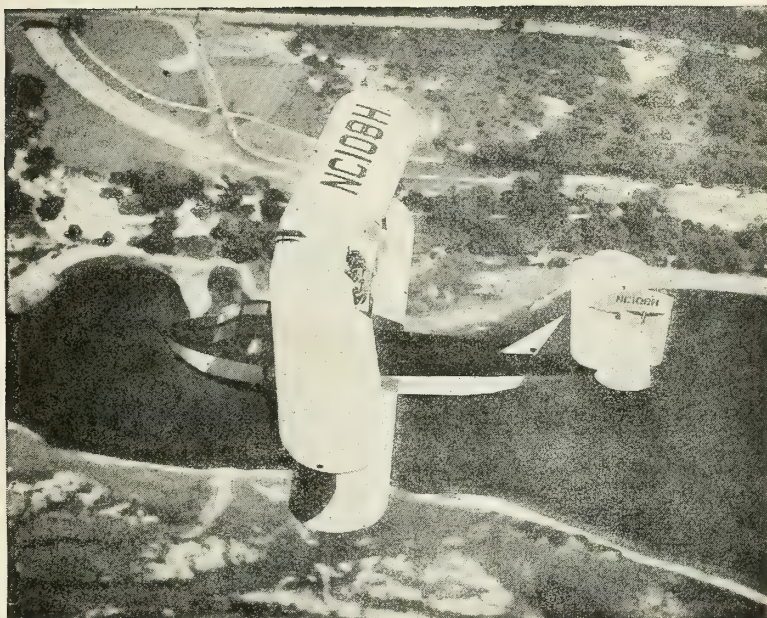
A long distance call to New York. Soon a doctor and a trained nurse were speeding northward in an Ireland Neptune.

A hurried consultation showed that only one thing would do . . . the boy must be moved to New York for treatment. Into the plane went patient, doctor and nurse. Into the air . . . and back to New York and a successful recovery for the boy.

Only an amphibion plane could have accomplished this emergency trip. A

land plane could never have reached this isolated spot among the lakes and woods. Motor car and railroad train were out of the question. An Ireland Neptune accomplished the job smoothly . . . quickly . . . surely . . . all in the day's work.

The 5-place, open or closed metal hull



This Ireland Amphibion, flying swiftly and steadily, made the trip from New York to Lake Champlain and return within the day. The combined speed and comfort of the Neptune made possible this errand of mercy, this emergency saving of a boy's life.

of the Ireland is roomy and quiet. Ample space is provided for luggage, equipment or emergency load. The Neptune has a 480-mile cruising radius and is extremely economical to operate. An air yacht as complete and comfortable as you could desire.

See the Neptune and fly it. It's comfortable, air-worthy and water-worthy . . . it is at home anywhere . . . Call or write Dept. 8, Curtiss-Wright Flying Service, 27 West 57th Street, New York City and you'll receive complete information at once.

Sales agents for Curtiss-Robertson Airplane Mfg. Co., Curtiss Aeroplane and Motor Co., Incorporated, Ireland Aircraft, Incorporated, Moth Aircraft Corporation.

### **ANNOUNCEMENT**

Curtiss Flying Service is now a part of Curtiss-Wright Corporation, the recently announced amalgamation of Curtiss and Wright interests. Henceforth, Curtiss Flying Service will operate under the name of Curtiss-Wright Flying Service.

# **CURTISS-WRIGHT FLYING SERVICE**

A DIVISION OF CURTISS-WRIGHT CORPORATION

*"World's Oldest Flying Organization"*

Say you saw it in AERO DIGEST





## THE NEW KEYSTONE "PATRICIAN"

**T**HE latest version of the Keystone Patrician type was recently completed and test flown by the Keystone Aircraft Corporation of Bristol, Pa. (The first Keystone Patrician was described in detail in the December, 1928, issue of AERO DIGEST.) This new ship embodies several refinements which tend principally to increase the comfort of passengers. Although this plane was built especially for Transcontinental Air Transport and is equipped and arranged to comply with the requirements on that airline, it is representative of the standard production job. Since the needs of every air transport line differ from the others, the arrangement and appointments of the interior can be modified according to the demands of the purchaser. In this particular ship, for instance, the T.A.T. preferred to have the space provided for a smoking compartment utilized for regular passenger accommodations. Similarly, an airline operating in tropical climates would not require a cabin heating system, whereas one flying a route where low temperatures are encountered would require not only a full complement of cabin heaters, but also perhaps double windows and extra insulation.

The present Patrician is a twenty to twenty-three passenger monoplane powered with three Wright Cyclone engines of 525 horsepower each. According to reports, the ship maintains level flight on two engines with a full load and has a particularly low rate of descent with only one engine running.

This ship retains the approximately same overall dimensions as the first job, though the pilots' cockpit has been moved forward in relation to the wing and outboard engines. The result is that the pilot has exceptionally fine vision forward, to either side, above, and behind.

The pilot and co-pilot are seated side by side. Each has a complete set of controls, including control wheel, rudder pedals and brake extensions. Between the two seats there is an aisle affording easy access to the cabin. On the instrument board, three ignition switches are placed in the center within easy reach of both men, and above is a master switch, enabling all three engines to be cut off instantly. The stabilizer adjustment control is on the rear wall of the compartment between the two pilots and just above the level of their heads.

Navigation instruments are mounted on indirectly lighted panels, although instruments are equipped with luminous dials and indicators for emergency use in case of failure of the electric lighting supply. Power plant instruments are located in triplicate in the center of the board, with landing light and interior light switches mounted alongside. A fire extinguisher pump is placed at the left hand side and parachute flare releases at the right.

The main passenger cabin is roomy and handsomely finished, two factors contributing to comfort and confidence. Windows of non-shatterable glass extend uninterruptedly along the full length of the compartment. They open by sliding in a horizontal direction. A 10-inch sill with a polished wood finish is continuous along the lower edge of the windows. Although a few structural members of the fuselage extend in front of the windows from the upper to the lower sill, the passengers' visibility remains unobstructed.

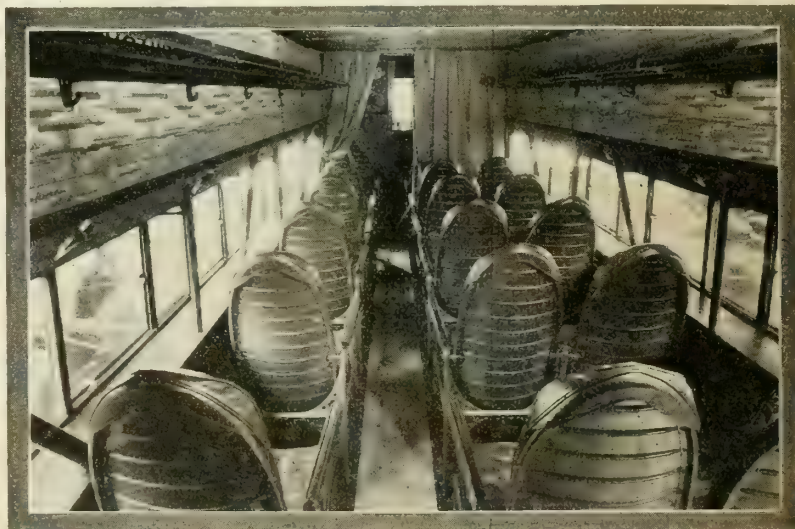
The dimensions of the cabin (six feet wide, six feet two inches high, and twenty feet long) permit of a number of different types of accommodations. In the T. A. T. ship, the chairs are placed three abreast, two on the right of the aisle and one on the

left. The interior space may, however, be utilized for sleeping berths, or part of it may be taken up by writing desks, etc. The chairs in the present job are of metal construction with high backs having an adjustable angle of inclination. The cushions and backs are upholstered with a chocolate-colored top grain leather.

On the forward wall of the passenger compartment is a panel containing several flight instruments, which are larger than normal so that they may be read by passengers in the back of the cabin. All the walls are upholstered with a patterned fabric, which is predominantly Nile green in color. There is a series of four dome lights along the center line of the ceiling, and above each chair is a small lamp set into the panelling and operated by an individual switch. A luggage rack is provided above each row of seats for the convenience of passengers with packages, coats and other belongings which are not carried in the baggage compartment.

It is possible to install in the cabin a radio loud speaker over which ground station programs may be picked up or through which, by means of a "cut-in" switch, the pilot may make announcements to the passengers.

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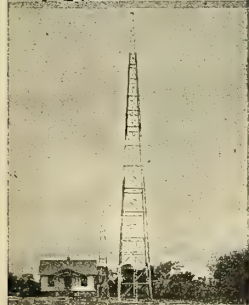


Seating arrangement of the new Keystone Patrician monoplane



AIRWAY  
BEACON  
TOWERS

U. S. Dept.  
of  
Commerce



RADIO  
BEACON  
TOWERS

T. A. T.  
U. S. Dept.  
of  
Commerce



CEILING  
LIGHT and  
WIND CONE  
TOWERS

Port Columbus



BOUNDARY  
LIGHT  
SUPPORT



CURVED ROOF STEEL HANGAR

# TRANSCONTINENTAL AIR TRANSPORT, INC.



ST. LOUIS, MO.

July 10, 1929

GENERAL OFFICE  
SYNDICATE TRUST BLDG.  
10TH AND OLIVE STREETS

International Derrick and Equipment Co.  
Columbus, Ohio

Gentlemen:

Nearly a year ago when preliminary plans were being formulated for the elaborate airway communication stations of Transcontinental Air Transport, the selecting of appropriate radio antenna towers assumed a position of vital importance.

My past experience with International Derrick and Equipment Company towers, while in charge of the construction of several hundred miles of airway, led to the selection of more IDECO towers for this exacting duty, and I wish to express to you the real satisfaction afforded by my selection.

The IDECO radio towers ran true to form in that they were quickly and easily erected. The various parts fit with the nicety of a precision instrument, and properly primed and painted over the hot dip galvanized finish they stand as a permanent monument to progress and aviation.

Yours very truly,

*E. W. Proctor*

E. W. PROCTOR  
Communications  
T. A. T. Inc.

ENP:AB

## 90% of the World's Lighted Airways are using IDECO Beacon Towers

Years of specialization have given us an experience in building airway and airport equipment unequaled by any organization in the world.

IDECO equipment is used by the U. S. Army, Navy, Department of Commerce; The Transcontinental Air Transport Inc; The Texas Air Transport and by many Municipal and private airports.

Call or write our nearest branch, we will gladly give you the benefit of our experience in meeting your requirements.

## THE INTERNATIONAL DERRICK & EQUIPMENT COMPANY

COLUMBUS, OHIO

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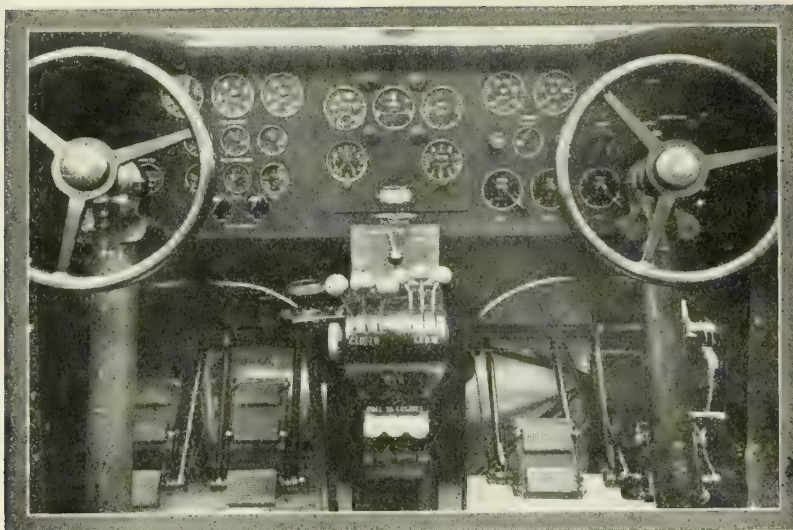
Houston

Shreveport

Denver

Maracaibo, Venezuela





Dual controls and instruments in the pilots' cockpit of the Keystone Patrician

(Continued from preceding page)

sengers while the plane is in flight.

To reduce the sound and vibration of the engines, the walls and ceiling of the cabin are insulated with a sponge rubber material. This insulation also acts to mitigate the effects of variations in temperature.

Although the T.A.T. ship is not so equipped, the space occupied by the first row of chairs can be converted into a separate smoking compartment, seating four persons. Such a smoking compartment would be separated from the remainder of the passenger accommodations by a wall with a special fire-proofing.

Forward of the passenger cabin is a walled-off space which may be used either as a porter's supply room, a radio room or a baggage compartment. In the present plane, it is intended for storage of baggage.

Aft of the passenger compartment, there are a lavatory and a small pantry room. The lavatory, which is more spacious than usual, is provided with wash basin, wall mirror, toilet, running water, etc. A thermo ice-water well is affixed to the wall at the entrance to the steward's pantry. This ice water container, which is operated by a hand pump with a vertical movement, will keep water cool for more than two days.

Entrance to the interior is gained through a door at the rear of the passenger compartment on the right side of the ship. The steps which are provided for entrance to and exit from the cabin slide into a recess under the fuselage when the ship is in flight.

The undercarriage, which is of the split axle type, is equipped with an oleo shock absorber unit combining heavy springs and an oil chamber. The springs absorb the initial shock, and the oil checks the more severe shocks. The wheels are fitted with internally expanding brakes with independent action. Balloon tires, 44 by 10 in size, are used. As on the original Patrician, the wheels and part of the landing gear are

covered by a streamline metal cowling.

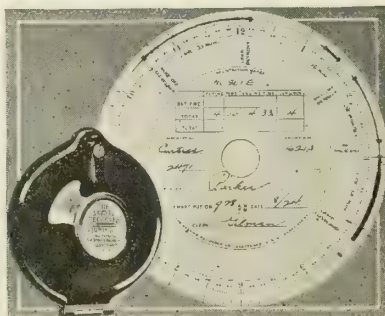
The fuselage structure is of welded chrome-molybdenum steeling tubing built in a series of trusses. Fabric, which is used as covering for the structure, is treated with six applications of acetate dope and painted a deep green and orange.

## SERVIS RECORDER AUTOMATIC AIR LOG

**T**HE Service Recorder Company of Cleveland has recently introduced an instrument which automatically records the activity of both plane and engine.

This instrument, known as the Servis Recorder, is a small and simple precision device which automatically writes a complete log of the ship. It is a self-contained unit operated by its own clock mechanism. A stylus which responds to the side-sway and vibration of the plane "writes" a record such as the one illustrated. It may be attached to any part of the cockpit or cabin. Being an independent unit, it is not connected with the engine or other mechanism.

Each day a fresh chart is inserted and the clock rewound. No ink is required; as the chart revolves within the instrument, a sapphire stylus scratches away an opaque wax coating, revealing the dark paper be-



The Servis Recorder and chart

The wing is constructed in four sections, two of which are built up of metal and two of wood. The inner sections, which extend from the fuselage to the point where the outboard engines are mounted, are made of structural steel I-sections and ribs. Three fuel tanks with a total capacity of 517 gallons are carried in these inner sections. The two outer wing panels are constructed of selected airplane spruce spars and ribs. The wings are also covered with fabric, dope-treated under the same process as the fuselage.

The tail surfaces are quite noticeably different from those of the earlier Patrician. There is one large-area fin and three rudders. The elevators are somewhat greater in span but smaller in chord.

### Specifications

Span .....	89 feet
Length .....	63 feet
Height .....	13 feet
Chord .....	12 feet
Wing area .....	930 square feet
Weight empty .....	9,825 pounds
Useful load .....	6,175 pounds
Pay load .....	3,600 pounds
Gross weight loaded .....	16,000 pounds
High speed .....	150 miles per hour
Cruising speed .....	120 miles per hour
Climb .....	1,400 feet per minute
Ceiling .....	16,800 feet

neath. At the end of the day a record of every movement of the plane appears on the chart. The six-inch chart makes a convenient and permanent operation record, giving a day-by-day log of both engine and ship.

The continuous narrow line (see illustration) indicates time elapsed while the chart was in the instrument. Wider lines tell the history of the day. Each operation has its distinctive symbol.

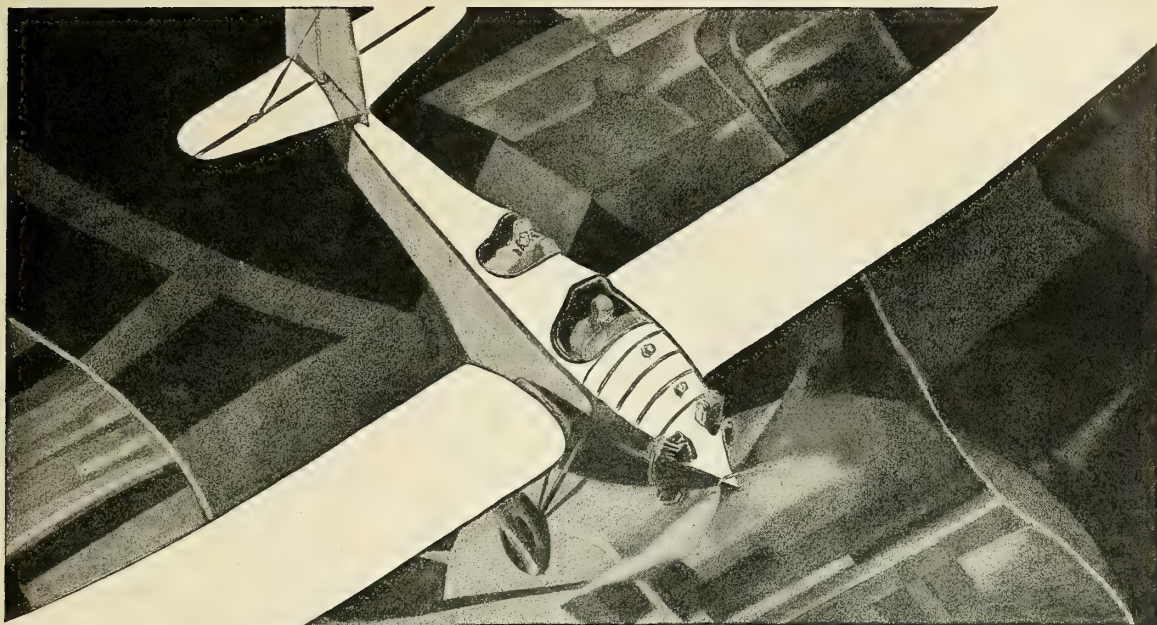
Two short, wide marks indicate that the ship was wheeled from its hangar to the gas tank and back again. The engine was first started at 10:18 a.m., as shown by a slightly wide even line and was warmed up for 12 minutes. A wide even line indicates the plane taxiing for a take-off, finally leaving the ground at 10:34 and flying continuously for one hour and 35 minutes.

At 12:10 the engine was shut off and not started again until 1:12 when the plane took off again for a short hop of 16 minutes. At 1:50 p.m. the plane again took off.

Here a narrow line indicates very smooth air. At 2:48 the plane was landed and its engine kept idling until 2:58, when the ship took off once more, this time to encounter rough air as indicated by the wide marking on the chart. At 4:30 the plane was back in its hangar.

At 5 p.m. the chart was removed from the ship and computed by means of a very simple chart totaler which revealed that the ship completed 4 hours and 33 minutes of engine time and 4 hours and 6 minutes of flying time. This information was then noted in a Time Record Book as a permanent record and the chart filed for reference.





# The NB3 is UP and earning

There are seven advantages to recommend the Barling NB3 as the logical training ship for Flying Schools.

While Other Flying School  
Planes are on the Ground  
For Rigging.

1. The all-metal structured, low wing mono-plane—of which the NB3 is the outstanding example—is the airplane of the future. No student's education is complete without a working knowledge of this type.
2. The NB3 is economical. Absence of rigging, turnbuckles, struts, etc., reduces upkeep—and the plane consumes only  $4\frac{1}{2}$  gallons of gasoline and one-half pint of oil per hour. The NB3's sturdy structure insures longer life.
3. The NB3 is safer for students. Non-stall, non-spin features are engineered into the plane—and the New-Day design assures stability even with hands-off flying.
4. The NB3 is in the air, earning money, while other planes are on the ground for overhauling. There is no rigging on the NB3.

5. Low-wing structure provides greater visibility on crowded airports—greater ease of operation and safety for the student.
6. The engineering features of the NB3 embody the newest theories of aerodynamics and construction for student study.
7. The student can learn preliminary cabin-plane flying in the NB3, since the feeling in relation to control of the ship in the front seat of the NB3 is exactly the same as in a cabin job. In other words—a \$3600 instead of a \$10,000 investment for preliminary cabin training.

Our new Sales Plan for School Operators is now in effect. Write for information.

NICHOLAS-BEAZLEY AIRPLANE CO., Inc.  
Manufacturing Division  
MARSHALL, MO.

# BARLING NB3

Monoplane



## CURTISS CRUSADER ENGINE

**T**HE Curtiss Crusader engine, which was shown to the aviation industry for the first time at the National Aeronautical Exposition at Cleveland, is the result of experiments made by Curtiss engineers to combine the performance of air-cooled airplane engines with aerodynamic qualities of the water-cooled design. The Crusader is a six-cylinder in-line inverted air-cooled power plant and was designed to reduce the head resistance and to increase the visibility of the pilot.

The center of the propeller hub is 53 3/64 inches below the highest part of the engine, placing the bulk of the engine below the pilot's line of vision, and facilitating inspection and repairs from the ground on the inverted cylinders. The width of the Crusader from engine mount to engine mount is 16 inches, which adds to the factor of visibility, and which, with its overall height of 27 1/4 inches, decreases the frontal resistance of the power plant. The engine is 56 1/8 inches in length overall, including propeller hub and magnetos.

The Curtiss Crusader develops 120 horsepower at 1,800 revolutions per minute. It weighs 345 pounds with all accessories except starter and generators, and with these added, has a total weight of 378 pounds. An air scoop is located on the exhaust side of the engine, which leads air from the propeller slipstream to the cylinders, and is

proportioned to maintain the proper cylinder temperatures. The air scoop is furnished with the engine. Two Scintilla magnetos located at the rear of the engine furnish ignition to two sets of spark plugs.

Each cylinder is made up of a forged steel sleeve machined all over, screwed and shrunk into an aluminum head. The head is designed with integral cooling fins, and has one large intake and one large exhaust valve. These cylinders are held to the crankcase by clamps instead of the usual hold-down nuts, simplifying the appearance of the engine and contributing to the ease of repairs. The crankshaft is made of alloy steel with bored crankshaft journals and pins, and has a bearing between each throw. The connecting rods are of the conventional I-section type, bronze bushed for the piston pin, and with removable babbitt-lined steel shells at the crankpin end. The pistons are made of high grade aluminum alloy, and have two compression and three oil rings.

The development of the Crusader engine has introduced the underhead camshaft, which is an overhead camshaft applied to an inverted engine, and combines the advantages associated with the overhead camshaft. The camshaft is driven from a vertical drive shaft at the anti-propeller end of the engine. The valve rocker arms have roller contact with the cams. The underhead camshaft is said to eliminate the usual

troubles with pushrods.

A single Stromberg carburetor, Model NA-R-5A, is located at the intake side of the engine, affording symmetrical manifolding to the three front and three rear cylinders. A hot air tube, provided with a control valve, is led to the carburetor through the crankcase.

The engine has the high pressure dry sump lubricating system. A pump unit at the anti-propeller end of the engine, on the cylinder cover, contains both pressure and scavenging pumps. The pressure pump, drawing oil from the tank, forces oil to all main and connecting rod bearings and parts requiring lubrication, some parts being oiled by spray thrown from the crankshaft. The bottom of the crankcase, around the cylinders, acts as a sump, which is scavenged at both propeller end and anti-propeller end by a propeller-end scavenging pump and also by the main scavenging pump. Camshaft bearings are lubricated under pressure and valves and rockers by spray.

### Specifications

Number of cylinders	.....6
Bore	.....4 1/2 inches
Stroke	.....5 1/2 inches
Piston displacement	.....441 cubic inches
Horsepower	.....120 at 1,800 r.p.m.
Weight with generator and starter	378 lbs.
Height overall	.....27 1/4 inches
Length overall, including propeller hub and magnetos	.....56 13/16 inches

## STATIC TESTS OF GREAT LAKES 2T-1 TAIL SURFACES

**T**HE Great Lakes Aircraft Corporation recently ran static tests of the horizontal and vertical tail surfaces of the sport training plane model 2T-1. The tests were witnessed and supervised by District Inspector Rough and Local Inspector White of the Department of Commerce.

Loading was accomplished by using sand bags of 2 1/2 pounds increment. This test was more severe than necessary since the surfaces were not supported while the load was being applied. All tail surfaces were checked at each 25 per cent increase in load for any signs of failure and reading of deflections.

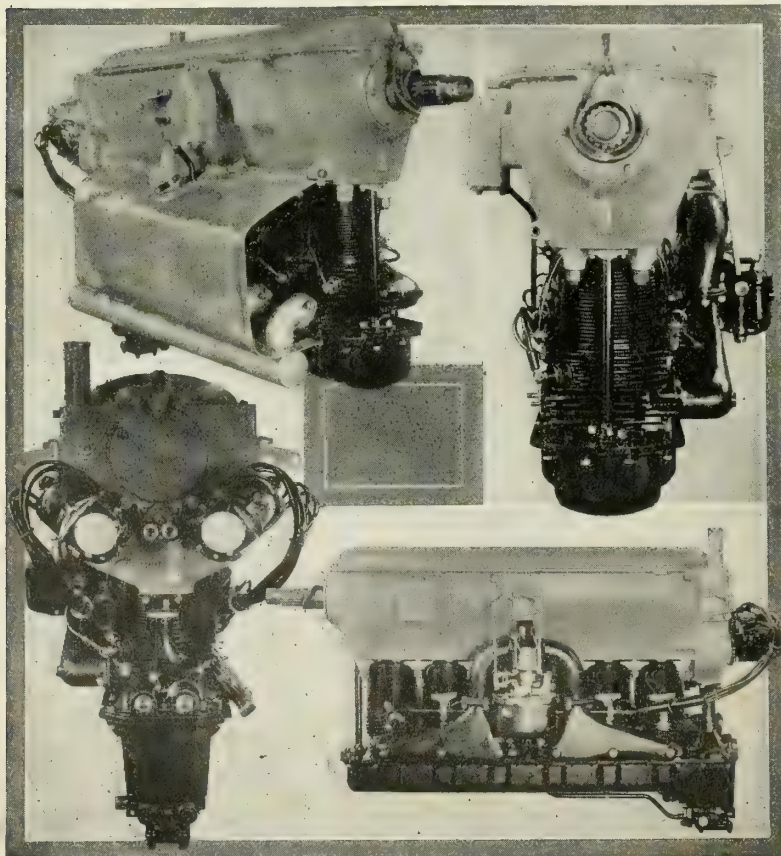
### Results of the Tests

**Stabilizer**—Loaded to 844 pounds or 150 per cent of design load, with no failure.

**Elevator**—Loaded to 445 pounds or five pounds under 200 per cent of design load. At the application of the last two bags failure occurred on one side, causing the fuselage to roll. The weight on the right hand elevator shifted to edge, causing failure.

**Fin**—Loaded to 150 pounds or 125 per cent design load, with no failure.

**Rudder**—Loaded to 140 pounds or 125 per cent of design load. At a point immediately beyond, failure occurred, consisting of buckling of all members at a point near hinges. There was no failure of rudder horns or any elongation of bolt holes.



Views of the 120 horsepower Curtiss Crusader engine





**Where**  
*the Bearings Must Not Fail*

**NORMA-HOFFMANN BEARINGS CORPN.- STAMFORD CONN. U.S.A.**



# SIMPLEX CONVERTIBLE MONO-BIPLANE

THE most recent ship which has been added to the Simplex Red Arrow line, manufactured by the Simplex Aircraft Corporation, Defiance, Ohio, is a dual plane, being convertible from biplane to monoplane or vice versa, in less than five minutes. This is one of the few planes incorporating this feature.

This ship was shown for the first time at the Cleveland races and will soon be placed in regular production.

It will be offered in two models, one equipped with a J-6 Wright Whirlwind 5-cylinder, 165-horsepower engine and one with a J-6 Wright Whirlwind 7-cylinder, 225-horsepower engine.

The 165-horsepower job is designed to serve as a training ship, with good performance both as a monoplane and as a biplane. As a biplane it may be used for elementary training and as a monoplane for advanced training.

It is also adaptable as a feeder line ship on mail lines where the pay load of 600 pounds will meet the requirements of the line.

The construction of the ship is in line with the quality of all Simplex planes. The speed and maneuverability of the ship, either as a monoplane or biplane, is said to be very good.

## Specifications

### Wright Whirlwind 165

	Biplane	Monoplane
Wing area...	200 square feet	140 square feet
Chord, upper...	.60 inches	.60 inches
Chord, lower...	.36 inches	—

	Biplane	Monoplane
Span, upper...	32 feet 9 inches	32 feet 9 inches
Span, lower...	24 feet	—
Gap	33.5 inches	—
Stagger	24.75 inches	—
Length overall	21 feet	21 feet
Wt. empty...	1,400 pounds	1,324 pounds
Useful load...	1,250 pounds	700 pounds
Pay load...	600 pounds	200 pounds
Total wt.	2,650 pounds	2,024 pounds
Max. speed...	125 miles per hr.	140 miles per hour
Cruis. speed...	110 miles per hr.	125 miles per hour
Land. speed...	45 miles per hr.	50 miles per hour
Cruis. radius...	700 miles	600 miles

The 225-horsepower job is built for sport flying and for the use of those requiring rapid transportation for business purposes.

	Biplane	Monoplane
Wing area...	200 square feet	140 square feet
Chord, upper...	.60 inches	.60 inches
Chord, lower...	.36 inches	—
Span, upper...	32 feet 9 inches	32 feet 9 inches
Span, lower...	24 feet	—
Gap	33.5 inches	—
Stagger	24.75 inches	—
Length overall	21 feet	21 feet
Wt. empty...	1,400 pounds	1,324 pounds
Useful load...	1,200 pounds	700 pounds
Pay load...	600 pounds	200 pounds
Total wt.	2,650 pounds	2,024 pounds
Max. speed...	150 miles per hr.	165 miles per hour
Cruis. speed...	135 miles per hr.	150 miles per hour
Land. speed...	45 miles per hr.	50 miles per hour
Cruis. radius...	650 miles	550 miles

## PRINCIPLES OF SOLDERING ALUMINUM

By A. G. Oakley, Solder Department, Reynolds Metal Company

SUBSTANTIAL repairs are comparatively simple and easy when the mechanic has a good quality aluminum solder and understands, not only how to proceed, but why he should follow a certain method of applying the solder.

A good aluminum solder will work at about 350 degrees and will be harder than the casting when cold and of about the same strength. It will "tin" on easily and be free from all impurities, bonding perfectly. It must be kept well wrapped; absolutely clean and free from grease, acid and alkali solutions, and must not be handled with greasy hands.

If the solder has been made from virgin metals properly cleaned, and is carried through the correct temperature range in melting and casting, it will not be materially affected by age if kept clean and dry, but, however good it may be, it will not make a good job unless it is properly applied. The work must be carefully prepared to receive it.

Assuming that we have a three-inch crack in a crankcase—the first thing to do is to cleanse the metal with gasoline in order

to remove all grease and oil so that the full extent of the break can be ascertained.

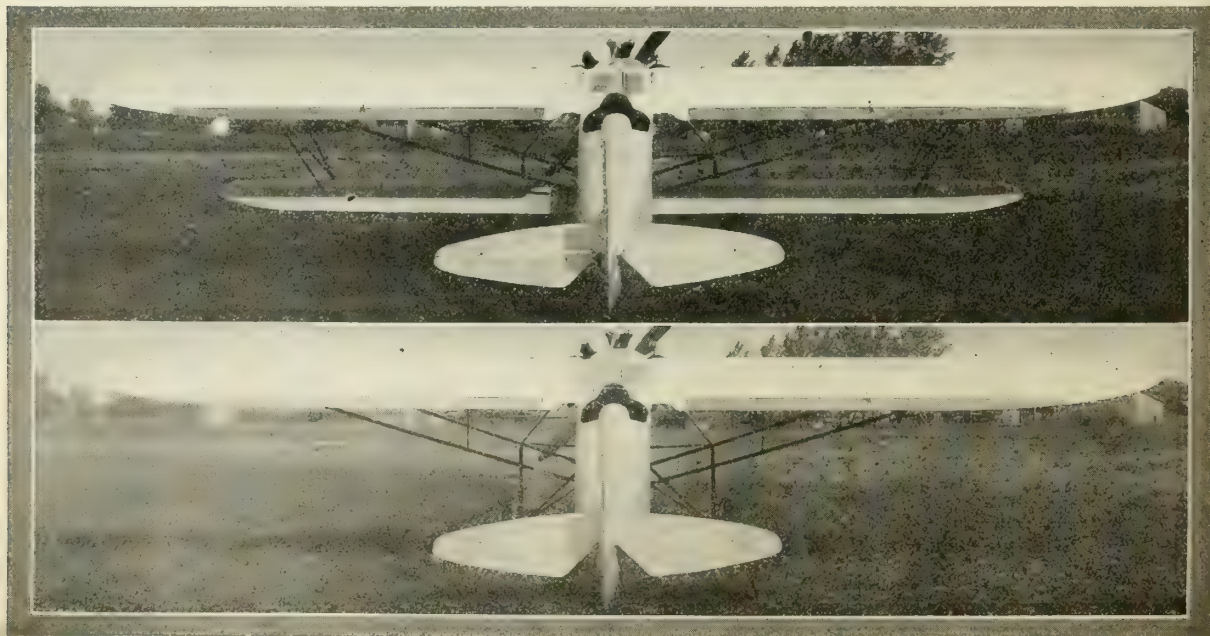
It is then necessary to cut a V-shaped groove along the crack so that the angles of the V are about 45 degrees and smooth, using a thin, sharp cold chisel ground like a wood chisel.

After this groove has been cut, the metal on both sides of the top of the groove should be cut off for about one to one and one-half inches back from the edge of the V. This grinding or scraping will remove the outer coating of aluminum oxide and rough porous metal, and leave exposed, a bright clean and smooth surface of aluminum.

Oxygen from the air combines with aluminum, forming aluminum oxide, a colorless coating over the entire surface. Scrape or file it off, and immediately it begins forming again. Nothing will adhere to aluminum over this coating of oxide.

To tin properly an aluminum casting or sheet with aluminum solder, scrape, file or grind off the surface to be coated until it is clean and smooth. Heat with the torch until hot enough to melt the solder freely, then

(Continued on next page)



Biplane or monoplane, as desired, the Simplex is convertible in less than five minutes

# FLY WITH US THIS WINTER



## IN SAN ANTONIO

(where Uncle Sam puts wings on his fledglings)

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free employment service, barracks at field. Under management with 10 years successful experience in Aviation. Railroad fare refunded to students of commercial and transport courses.

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References: Guaranty State Bank; San Antonio Chamber of Commerce

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(Continued from preceding page)

coat the entire surface by rubbing the solder lightly over the surface, leaving a liquid coating behind.

Now, apply heat directly to this coated surface to keep it in a thoroughly liquid condition, and at the same time, take a clean wire or brass brush and brush the coated surface vigorously, playing the torch over the solder coated surface all the while to keep it from cooling.

This brushes the newly formed oxide off of the aluminum and, at the same time, works the molten solder into the pores of the metal without allowing air to come in contact with the aluminum again. This gives a perfectly tinned surface and a good bond.

Now a smaller flame may be used. Heat up the tinned surface and apply solder directly in the flame if desired, melting down enough to fill the groove and reinforce the work. Solder should be hot enough to be plastic and waxy, but not hot enough to flow.

Use a putty knife or some similar instrument to work and knead this plastic mass like kneading dough. This works it into a solid, tough and dense condition.

Fill in the groove; work it well down the sides and to the bottom, forcing it entirely through, packing it solid and overlapping the shoulder of the V to reinforce the work for additional strength. Allow the work to cool in the air.

The solder will be very brittle for the first two or three minutes. It takes some little time for it to solidify. If the casting has been heated more than necessary and has been caused to expand, it may cool off a bit before the solder has time to solidify and thus cause a small crack to open in the soldered seam that could have been avoided by allowing the casting to cool a bit before filling in the break. If this does occur, turn the flame down lower and after the job has cooled off, melt down the solder along the crack and with the putty knife work it into a solid mass again and the job will be all right.

For sweating joints, tin both surfaces to be joined in the manner described above, puddling on a little excess solder on one surface to make good contact, laying the other piece over this solder. Heat until fusion has taken place and clamp together until cool.

After two sheets have been tinned, they may be joined with common solder.

## SPARK PLUG EXAMINATION

By HECTOR RABEZZANA  
Chief Spark Plug Engineer,  
AC Spark Plug Company

WITH the general trend toward higher compression engines, the importance of keeping spark plugs in the best condition cannot be over-emphasized if the maximum of efficient engine operation is to be enjoyed. A surprisingly large percentage of poor performance may be traced and often eliminated by an examination of the spark plugs, which are often responsible for engine trouble that comes under the following classifications:

1. Engine hard to start—misses at low idling speeds, sluggish.
2. Engine loses power on long runs or at high speed.

Conditions described above may be caused by fouled, worn out or wrong-type spark plugs, breaker points or improper adjustment of spark plug and breaker point gaps.

If the plugs are fouled, obviously they should be cleaned; and if worn out, they should be replaced. If the plug gap is too wide, it should be adjusted to .025-inch for average engines and .020-inch for high compression engines, also engines having magneto ignition.

In the case of fouled spark plugs that are comparatively new, cleaning is easily accomplished as follows:

Fill the lower part of the plug with alcohol, metal polish or equal parts ammonia and water, and let it stand for a few seconds. Rub carbon from insulator with stiff wire or small wooden peg covered with one thickness of cloth. Then wipe the plug dry. Clean the sparking points with emery cloth. Adjust the gaps. Worn out plugs, however, cannot be restored by cleaning.

The accompanying illustration showing how the plugs deteriorate and the explanatory reference should be helpful to the mechanic in his work.

1. Center wire burned away causing missing of engine. Improper type plug responsible for deterioration.
2. Plug insecurely screwed in engine, causing hot gases to blow by the thread and melting the insulator, thus destroying the plug. Always install plugs securely and avoid this trouble.
3. Typical worn out plug.
4. This plug should be replaced. Note wear on side wire, and wide gap between side and center wires.

## A NEW PROCESS FOR TREATING ALUMINUM

A NEW process for treating aluminum which hardens the metal and reduces the tendency of the surfaces to smudge, tarnish or scratch, imparting resistance to the effects of salt water and the various acids and other corrosive agencies recognized as destructive to aluminum, has been developed by engineers of the Perma-Chrome Process Corporation, Cleveland, Ohio.

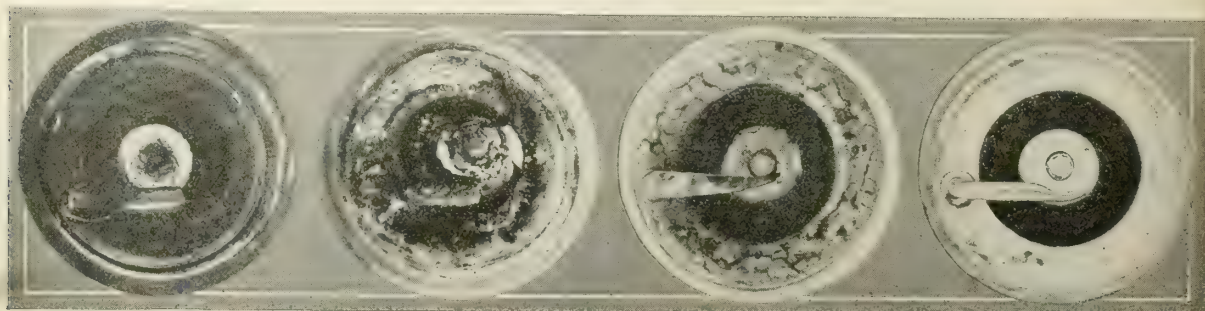
This new process is the result of research conducted by Harry F. Gardner, formerly of the Bureau of Standards. In its effect this new process may be compared to the cyanide process of hardening the surface of steel. In other aspect its results are similar to the well-known alundum process for treating aluminum. Items treated are completely submerged and the effects equally imparted to every part of the metal. Aluminum's inherent advantages of ductility and flexibility in forming, shaping, stamping or spinning are preserved and the new hardening and finishing process applied afterward.

Scleroscope tests in the laboratory on one concern showed an increase in hardness and density of over 100 per cent. The scleroscope reading for standard aluminum is 7 points; the reading for the same sheet after treatment was 16 points.

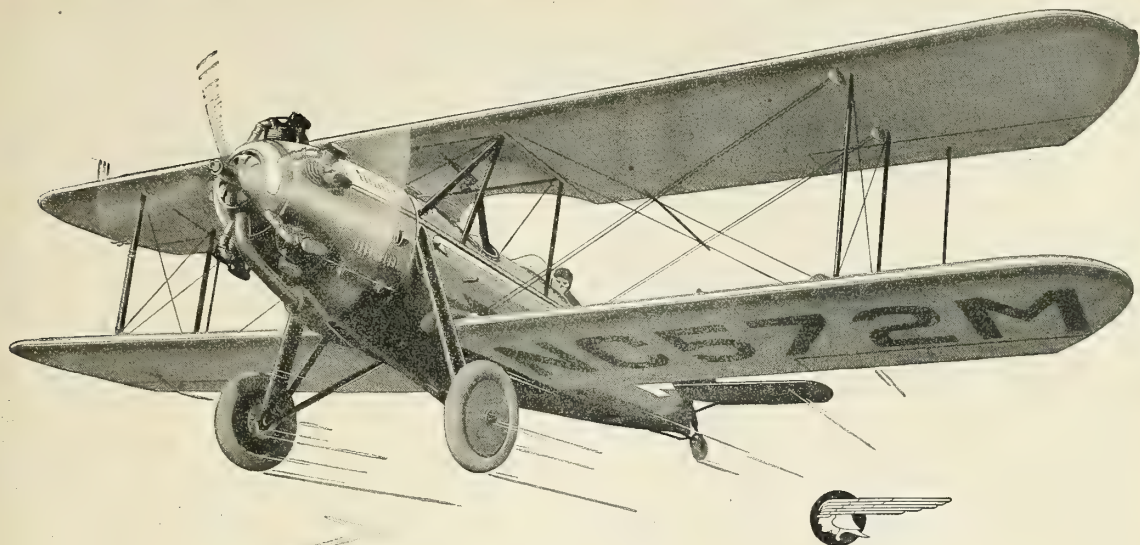
Tested for 336 hours in a twenty per cent salt solution, metal treated by the process showed no effects. Subjected to hydrochloric acid, which normally dissolves aluminum, metal treated by the process showed, under time test, twenty times the resistance of aluminum or aluminum alloys.

A probable use of the process is for aluminum sheets and extruded shapes in airplane manufacture. These are now often heavily coated with protective pigments against the corrosive action of salt water and salt air. This adds considerable weight which the new process is said to eliminate. It is now being tested out also on aluminum pistons, one of its reported advantages being that it treats the whole piston unit, piston, piston ring grooves, rings and bearings quickly and evenly in one submerging operation. The chemical action of the new process not only effects a change in the texture and surface structure of the metal, but effects an increase in hardness and density.

The officers of the Perma-Chrome Process Corporation are: J. V. Whitbeck, president; Clyde Morgan, vice-president; Wm. Chandler, general manager; and J. I. Kral, secretary and treasurer.



1 2 3 4  
Spark plug troubles described above



## DISTINGUISHED FROM ALL OTHERS BY ENGINEERING

SPARTAN AIRCRAFT COMPANY has added to its organization a new class of specialists . . . men who conceive on paper an airplane with surfaces so proportioned and weights so balanced as to assure maximum performance in flight with utmost safety in operation . . . men who understand quality of metal and how to utilize its greatest strength without an ounce of surplus weight . . . men who know true-grain timber and its proper stage of seasoning . . . and men with long experience in the application of important fabric surfaces.

With such an organization of master craftsmen and engineers Spartan is producing an airplane of outstanding dependability and performance . . . an airplane that is distinguished from all others by Engineering. . . . .

A Folder describing the new Spartan C-3-165  
(A. T. C. No. 195) powered by the Wright  
Whirlwind Five will be sent on request.

**SPARTAN AIRCRAFT COMPANY**  
TULSA, OKLAHOMA





## CARRIER PIGEON II

**A** NEW air mail plane has been developed by the Curtiss Aeroplane and Motor Company. In flight tests conducted at the Curtiss company's experimental plant at Garden City, L. I., this plane, named the Carrier Pigeon II, has carried a pay load of 2,000 pounds at a speed of 151 miles an hour.

Power is supplied with a geared Curtiss Conqueror engine, a twelve-cylinder power plant developing more than 600 horsepower. It is connected by a two-to-one reduction gearing to a Curtiss-Reed metal propeller having three adjustable blades. The engine and radiator are completely cowled in.

To increase the aerodynamic efficiency of the ship, the landing lights, located at the extremity of each lower wing, have been made retractable, and when they are not in use, the outer lenses are flush with the wing curve. The navigation lights are built into the tips; and the tail wheel and its strut are enclosed in a sheet metal fairing so that only the lower half of the wheel is directly exposed to the air stream.

The plane is a single-bay, unequal span staggered biplane. The upper wing is considerably forward of the lower wing, and is slightly larger. The fuselage is of the semi-monocoque type, with the skin of the fuselage built to carry a part of the load. Monocoque construction is applied to the mail compartment, leaving it entirely free of interior bracing. This compartment, which has a capacity of 125 cubic feet, is made entirely of metal to reduce the fire hazard.

To facilitate the replacement of parts, the fuselage is constructed in three sections built separately and bolted together. These are the engine mount, the mail compartment and the rear section, which includes the pilot's cockpit.

The pilot's seat is adjustable three ways: to or away from the rudder pedals, up and down ten inches, and variable angles of inclination of the seat back.

The instrument board has been so placed that it meets the pilot's line of vision at an angle of ninety degrees. The windshield is a large single piece of pyralin, which has a trough at the top to collect water as it is driven up the sloping surface, thus preventing it from flying back into the cockpit.

The cockpit is completely insulated to keep out drafts and cold, and is heated by a small steam radiator similar to those used in the Condor.

The flying instruments are grouped on the instrument board in a special panel which can be removed as a unit to facilitate tests and repairs, and is accessible from the mail compartment. The instrument board is illuminated by two hood lights, which are controlled by a rheostat and may be dimmed to eliminate reflections from the glass coverings.

The rudder pedals are adjustable, and may be moved either forward or back. By means of a hand lever, they may be made to operate both the rudder and wheel brakes or the rudder only. This lever has three positions. In the first, the brakes are completely off and the pedals operate only the rudder; in the second, the rudder pedals operate the rudder and brakes; and in the third, the lever itself applies the brakes to both wheels. In the third position, the lever acts exactly the same as the emergency brake of an automobile, holding the plane motionless while the engine is being warmed or under other conditions where the ship might roll. All joints and bearings in the control mechanism are visible through inspection windows.

In order to reduce the noise of the engine, the air-cooled exhaust manifolds have been equipped with two bayonet type outlets which discharge under the lower wings, one on either side of the fuselage.

A dihedral angle of three degrees has been rigged into the wings to provide lateral stability in flight.

### Specifications

Span overall	47 feet 6 inches
Length overall	34 feet 6 1/4 inches
Height overall	13 feet 4 inches
Chord, upper	88 inches
Chord, lower	68 inches
Gap	80 inches
Stagger	49 inches
Incidence, upper and lower	1 degree
Dihedral, upper and lower	3 degrees
Total wing area	553 square feet
Aileron area	52.6 square feet
Stabilizer area	82.6 square feet
Fin area	37.8 square feet

Elevator area	40.2 square feet
Rudder area	28.0 square feet
Wing loading	13.37 lbs. per sq. ft.
Power loading	12.33 lbs. per h.p.
Aerofoil section	C-72
Load factor	6
Fuel consumption (full throttle)	318 pounds per hour
Oil consumption (full throttle)	9 pounds per hour

Fuel capacity	175 gallons
Oil capacity	16 gallons
Propeller diameter	13 feet
Weight empty	4,212 pounds
Structure	2,053 pounds
Power plant	1,807 pounds
Fixed equipment	352 pounds
Useful load	3,388 pounds
Crew	200 pounds
Fuel and oil	1,110 pounds
Equipment	78 pounds
Pay load	2,000 pounds
Gross weight loaded	7,600 pounds

### Performance

High speed	151 miles per hour
Stalling speed	65.2 miles per hour
Cruising speed	122.5 miles per hour
Rate of climb	850 feet per minute
Endurance (full throttle)	3.11 hours
Endurance, cruising	4.40 hours
Range (full throttle)	470 miles
Range, cruising	550 miles
Service ceiling	12,200 feet
Absolute ceiling	13,900 feet
Climb in 10 minutes	6,400 feet

## VAN DORN GRINDER

**A** NEW 6-inch bench grinder has been announced by the Van Dorn Electric Tool Company of Cleveland, Ohio. It has been built for tool dressing, sharpening hand tools and light grinding of all kinds.

## NEW PREST-O-WELD TWO-STAGE OXYGEN REGULATOR

**T**HE Oxxweld Acetylene Company, New York City, has added to the Prest-O-Weld line a two-stage oxygen regulator, designed to eliminate fluctuation in working oxygen pressures. This regulator, which is designated the type R-109, incorporates the stem type valves.

The chief feature of the design is two-stage pressure reduction, accomplished through the medium of two independent sets of diaphragms, valves and springs. Instead of reducing in one stage the full cylinder pressure of about 2,000 pounds per square inch down to working pressure, which is often only a few pounds per square inch, the R-109 regulator reduces through this range in two stages. In the first stage the cylinder pressure is reduced through a non-adjustable reducing valve to about 175 pounds per square inch. Leaving the first stage, the oxygen passes to a second valve and diaphragm assembly, where the pressure is reduced to that desired by the operator, the second stage reducing valve being adjustable by means of the hand wheel.

# Another Airport Recommends Stanolind Aviation Products

Mr. L. J. Thompson, Manager  
Standard Oil Company, (Indiana)  
Grand Rapids, Michigan

Dear Sir:

Dependable fuel and lubrication are of utmost importance, hence this letter of appreciation. We selected Stanolind Aero Oil and Aviation Gasoline for the Benton Harbor Airport because they are as near perfect, we think, as engineers are able to make them. All our flying is done with your products.

We also wish to thank you and your organization for the courtesy and service extended to us all times and will highly recommend Stanolind Aviation Gasoline and Aero Oils to all pilots and airports.

Yours very truly,  
ALLEN FLYING SERVICE  
Ray E. Allen

Every Sunday afternoon between 2:00 and 3:00 P. M., central standard time, the Standard Oil Company (Indiana) will broadcast the incomparable music of the Chicago Symphony Orchestra over the following stations:

WGN Chicago  
WWJ Detroit  
WTMJ Milwaukee  
KSD St. Louis  
WOC Davenport  
WHO Des Moines  
WEBC Superior  
KSTP St. Paul-  
Minneapolis  
WDAF Kansas City  
WOW Omaha

*For Quick Service  
Use Air Mail*

TODAY Stanolind Aviation Gasoline and Aero Oils are well known at midwestern airports and preferred by the majority of pilots. These men know that they can rely on the supreme quality of Stanolind Aero Products as their best insurance against engine trouble.

## STANDARD OIL COMPANY (Indiana)

General Offices: 910 South Michigan Ave.

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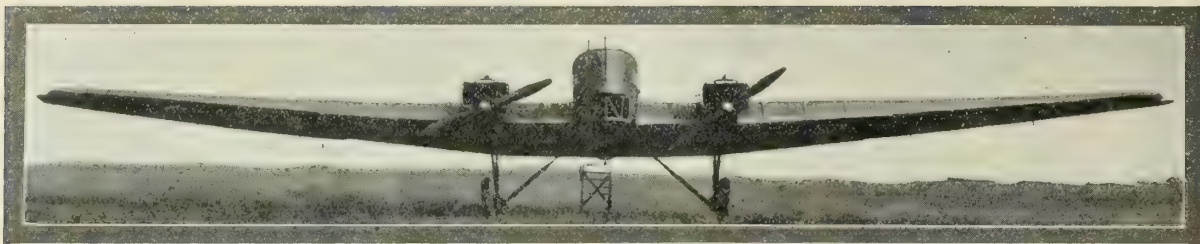
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Peoria  
Quincy

South Bend  
St. Louis  
St. Joseph  
Wichita

323





## RUSSIAN MONOPLANE, "LAND OF SOVIETS"

**T**HE Soviet twin-engined plane used in the Moscow to New York flight of the Russian aviators Shestakov, Bolotov, Sterlingov and Fufae, is officially designated A.N.T.-4. More generally known as *Land of Soviets*, this plane is the latest creation of the Central Aero Hydro-Dynamic Institute of the U.S.S.R., located at Moscow. Its design and construction were developed under the direction of Mr. A. N. Tupoleff, an aviation engineer connected with the Institute.

The plane is powered with two 600 horsepower B.M.W.6 engines located on steel tubing mountings at the leading edge of the wing, on either side of the fuselage.

The *Land of Soviets* is a monoplane with a multi-spar wing. This wing consists of three main sections—two end sections carrying the ailerons, and a center section attached to the fuselage. Besides these main sections, the fuselage has also a detachable head and tail sections.

The outer wing sections are attached to the center section by means of ten tapered bolts, subject to shearing stress and running through pipe connections of high carbon steel tubes. These connections terminate the tubings of abutting longerons, which arrangement permits of making a quick and rigid connection. The construction of the wing consists of five Kolchug aluminum (Soviet dural) spars connected by ribs and covered with Russian corrugated duralumin.

The fuselage is made up of three sections: the forward section carries the pilot's cockpit, instruments and controls for the plane and engines; the central section consists of the wing center section and that part of the fuselage projecting partly above the

wing; and the aft section, the remainder of the fuselage including the empennage.

The fuselage construction consists of four longerons and stays of Kolchug aluminum, covered with corrugated dural. All sections of the fuselage are fastened together with tapered steel bolts subject to shearing stress.

Tail coverings are of sheet dural. The stabilizer can be adjusted during flight. It is located above the fuselage, and its axis of rotation is at its leading edge. The trailing edge of the stabilizer, together with the elevators, is adjustable by means of a worm and gear drive. The fin and rudder are mounted on the tail post, which is a unit with the tail section of the fuselage. All control members have compensators.

The undercarriage may be converted so as to use seaplane floats. For operations from land, it has a two-wheeled landing gear made of steel tubing, suspended and hinged to the bottom of the wing. This chassis is provided with rubber shock absorbers which are fastened to the plane with only six bolts.

The seaplane arrangement consists of two floats and sixteen brackets, fastened to the plane on either side of the chassis. Only one additional bolt is necessary for the floats.

The gasoline tanks are of riveted dural and are placed in the wing. The eleven main tanks are located in the central part of the plane; only one tank is placed at the end of each wing. The total fuel capacity of all the tanks is 872 gallons. The oil tanks are located in the wing and back of the engines. There is also an emergency oil tank, placed in the center of the fuselage, with a pump which can deliver oil to any of the other tanks. In this section there is also a spare water tank for over-sea flying.

This tank is also supplied with a pump for delivering water to the radiator.

The radiators are of the honeycomb type. The starter is of the compressed air type. Room is provided in the central part of the wing, which also forms a part of the fuselage, for sea equipment, such as an anchor, ropes, etc. In the bottom of this section of the plane, there are several hand holes for inspection purposes.

### Specifications

Wing span .....	93.8 feet
Wing chord (maximum).....	18 feet
Length overall .....	59 feet
Height overall .....	15 feet
Stabilizer span .....	24.75 feet
Wing area (including ailerons)	1,291.7 square feet
Aileron area .....	148 square feet
Stabilizer area .....	104.5 square feet
Elevator area .....	92 square feet
Rudder area .....	44 square feet
Fin area .....	34 square feet
Gross weight loaded.....	17,050 pounds
Weight empty .....	9,900 pounds
Maximum speed .....	125 miles per hour
Cruising speed .....	102.5 miles per hour
Landing speed .....	56 miles per hour
Normal range .....	1,430 miles
Wing loading ..	13.2 pounds per square foot

## AIRPLANE WELDING

By J. B. JOHNSON

Published by Goodheart-Wilcox Co., Inc.

"**A**IRPLANE Welding" by J. B. Johnson, Chief of Materiel Branch at Wright Field, is a single volume of ten chapters devoted principally to the equipment and various methods of welding, such as oxy-acetylene, arc and flash-welding, which are described in detail. The metallurgical processes involved in making and testing a weld are explained in non-technical language. Several methods of joining are also described briefly. The design and construction of welding jigs is taken up both from the standpoint of the builder of one airplane and the manufacturer who is engaged in quantity production. The welding of aluminum and special materials, such as Monel metal, stainless steels is also explained. Predicting that the airplane of the future will be made of alloy steels and aluminum alloys, the author has devoted special attention throughout the text to the application of alloy steel to the manufacture of airplanes. The text is illustrated with photographs, tables and diagrams.



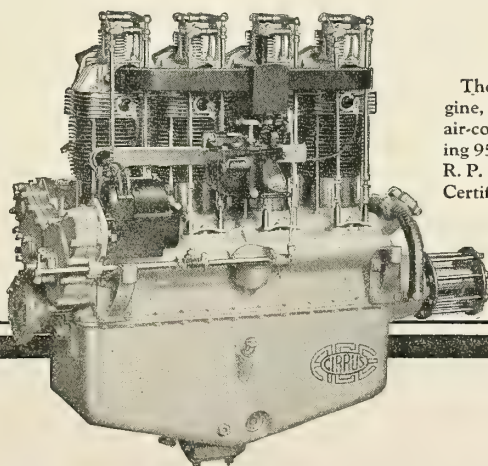
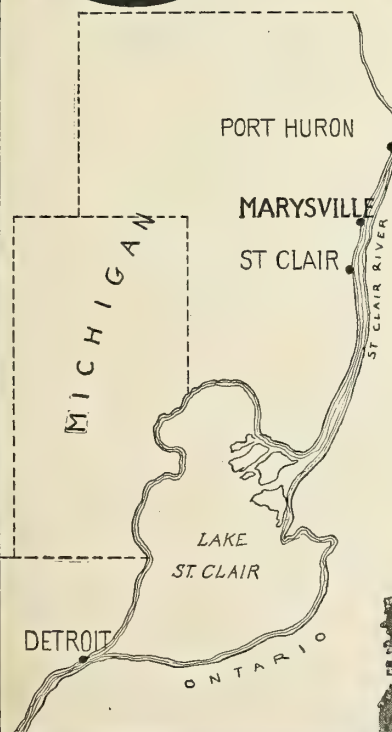
The twin-engined monoplane which flew from Soviet Russia to the United States



# EXPANSION!

**O**WING to the rapidly increasing demand for the American Cirrus engine, this Company has been forced to acquire a plant which would allow for its rapid expansion and enable the production schedules required to be met.

The new American Cirrus plant at Marysville, Michigan, is a factory with a total floor space of nearly 300,000 square feet, on a property comprising 150 acres with a river frontage of 3100 ft. It is situated in one of the greatest aviation centers of the United States, being only a few miles from Detroit, and is admirably suited for the production of aircraft engines. Here the company will be able to give its customers even greater service than ever before.



The American Cirrus Engine, a vertical four in line air-cooled motor developing 95 horsepower at 2100 R. P. M. Approved Type Certificate No. 30.



Please address all  
correspondence to

**AMERICAN CIRRUS ENGINES, INC.**  
**MARYSVILLE, MICHIGAN**



# Opel Sander Rocket Plane

By

Edwin P. A. Heinze

ON September 30th, Fritz von Opel, whose rocket car was widely heralded last year, completed his first successful flight in a rocket-powered airplane, rising with it to an average height of approximately sixty feet and flying half round the flying field of Rebstock near Frankfort-Main. The flight was the first external evidence of success in the series of experiments looking toward the development of rocket propulsion for aircraft to travel in the upper air at altitudes of about 32,000 feet. All previous rocket propulsion attempts, including those of the rocket car, have been made solely with this same ultimate aim and not for the sake of publicity, as has frequently been suggested. Fritz von Opel is convinced that sooner or later flight in the stratosphere, the upper level of calm atmosphere, which because of the rarity of the air offers very little resistance to flight and therefore admits of speeds at present inconceivable, will link up the continents over the ocean. But that is far in the future, he admits. In an interview for the *New York Times*, he said, "The aim of the present test is two-fold. First, I want, though it has been denied by many, to prove that a rocket flight is possible and may be carried out without difficulty, if thoroughly prepared. Secondly, I want to demonstrate what power a simple rocket, such as that invented by my co-worker, Professor Sander, can develop and how a plane can start, without the necessity of a flying field or troublesome equipment, from any flat roof or even from a motor truck.

"The lifting capacity of the rocket now has been increased from 20 kilograms (about 44 pounds) to 3,000 kilograms (about 6,600 pounds). This means, literally, that it is able to hurl a loaded motor truck through the air.

"Applied in a reverse way, our rocket is a valuable means for landings—especially for forced landings. I expect to demonstrate landing within a circle of 33-foot radius. For example, a rocket weighing eleven pounds is sufficient to act as a brake on a



Placing rockets in the container of the Opel Sander Rocket Plane

plane weighing 1,540 pounds and to place it on the ground without any run out. This, too, may sound fantastic, but it will be proved."

Von Opel is collaborating with the German engineer Sander, who is a specialist in the construction of rockets. These two men, thanks to the large sums Fritz von Opel is able to invest in his scientific hobby, appear at present nearer the goal than several other groups working in Germany on the same problem.

The trials with the rocket car demonstrated the inadvisability of continuing these experiments with earthbound vehicles, since the propulsive force of the rockets is so great that the least unevenness in a road, or rails such as used in the last two car attempts, could bring disaster.

The rocket plane is of the glider type with a short fuselage which terminates just aft of the cockpit with a magazine containing spaces for rockets, each eighteen inches long and three inches in diameter. The plane was designed by Ernst Hatry, Mannheim engineering student. The elevators and two fins and rudders are fixed at the end of a girder structure extending rearwards from the parasol type wing and fuselage. Each rocket, when discharged, gives a propulsive pressure of 110 pounds. The plane, which with rockets and pilot weighs 770 pounds, does not start by its own power. It is mounted on a carriage running on

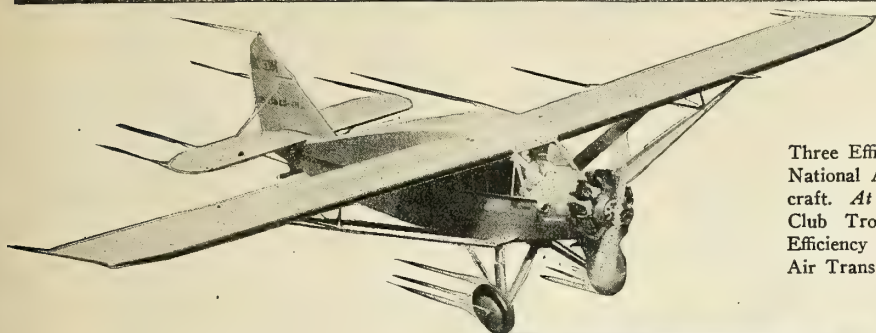
rails about fifty feet long, and the motive rockets, each with a propulsive pressure equal to twice the weight of the plane. At the end of the track the carriage is stopped by rubber buffers, while the plane is catapulted into the air. As the plane takes off, the first rockets are ignited electrically by the pilot, who can regulate the number he wishes to discharge. The rockets which carry the machine through the air burn for only twenty-five seconds, during which time they generate lifting power of twenty-four kilograms (about fifty-three pounds) per second. The plane shoots off the running track at a speed variously estimated at 120 to 150 kilometers (about 75 to 94 miles) an hour. Its speed when in midair is controlled by the intervals between the firing of the rockets. When the ammunition is exhausted, the plane can be brought to earth on the glider principle.

Several attempts failed before the successful one was made, and, as already pointed out, the tests are being continued systematically to obtain experience with various rocket sizes, constructions and fillings. The experimenters are said to have discovered a new liquid filling for rockets, which in the laboratory is said to have burned for forty-five minutes and the force of which can, therefore, be regulated. Powder filling does not admit of such regulation in respect of the force of the discharge, which is a great disadvantage.



The German Opel plane taking off with rockets as its sole source of motive power.





Three Efficiency Trophies won at Cleveland National Air Races, 1929, by Bellanca Aircraft. *At left:* Aviation Town and Country Club Trophy. *Center:* Cleveland-Buffalo Efficiency Trophy. *At right:* Detroit News Air Transport Trophy.

# A Pacemaker for Sales!

**T**HERE is no slump in Bellanca Sales! Very much to the contrary, sales of the new 1930 Bellanca *Pacemaker* are booming. Its acceptance by the flying public has been instantaneous since it was first shown at the Cleveland races.

Among the purchasers of the Bellanca *Pacemaker*, during the first thirty days following its public appearance, are—Eastern Air Express, for the New York-to-Miami service; Irving Air Chute Co.; R. C. Van Arsdale, of Boston; Compania Aerea Hondurena, a United Fruit subsidiary, of Tela, Honduras; Lloyd Campbell, of Kansas City; Inter-Island Airways, Ltd., Honolulu; Transportes Aereos Transcontinentales, Mexico City; Lloyd F. Layne, Memphis; Hercules Aeroplane Products Corp., of Los Angeles; Halley Aviation Management, Inc., Omaha; and A. H. Thurmond, of Kansas City. Several of these purchases were fleet orders, for three or more *Pacemakers*.

In addition, we have sold a number of Bellanca Seaplanes in Canada, following the Cleveland show. The new Bellanca has been chosen to meet a very wide variety of climatic and operating conditions.

These sales have directly resulted from the amazing Bellanca performance, clearly demonstrated by the success of Bellanca monoplanes at the Cleveland races—Bellanca's outstanding success with the Wright Whirlwind 300 engine—the up-to-date improvements represented in Bellanca Aircraft, of both landplane and seaplane type and the recognition of the inherent safety in Bellanca design.

The future of the 1930 Bellanca is definitely assured. The *Pacemaker* has won a wide and hearty acceptance . . . for its smart appearance and sturdiness; for its wide, new type landing gear, fitted with oil-draulic shock absorbers; for its safety, stability, beautiful cabin work, and performance. Bellanca Aircraft Corporation, New Castle, Delaware.

*Bellanca CH 300 or "Pacemaker."* Specifications: Six-place cabin monoplane. Dual control. Luxurious appointments. Structural strength 12% greater than Dep't. of Commerce requirements. *Landplane:* High speed, 145 m.p.h. Cruising speed, 122 m.p.h. Payload (with pilot), 1,235 lbs. Fuel capacity of both types, 5 to 7 hours.

*Seaplane:* High speed, 130 m.p.h.; cruising speed, 110 m.p.h.; payload (with pilot), 1,235 lbs. Both types built under U. S. Dep't. of Commerce Approved Type Certificate No. 129.

*The Pacemaker Freighter:* Dual control 34 cu. ft. closed freight compartment, 2 passenger seats and baggage compartment. Payload (with pilot), 1,745 lbs. U. S. Dep't. of Commerce Approved Type Certificate No. 245.



# BELLANCA



# RADIO BEACON INDICATOR

**T**HE radio beacon tuned reed indicator is an instrument designed by experts of the Radio Section of the Bureau of Standards, under the supervision of Mr. F. W. Dunmore, and is used to establish a flight course for planes by means of radio beams sent out from stationary radio beacons.

This instrument was publicly demonstrated by Lieut. James Doolittle in his "blind" flight at Mitchel Field, September 24, 1929, under the auspices of the Guggenheim Fund for the Promotion of Aeronautics.

The experimental model of this instrument were made by the Bureau of Standards, but the contract to manufacture the finally developed type for the Airways Divisions of the Department of Commerce and the Bureau of Standards, has been placed with Julien P. Friez & Sons, Inc., Baltimore, manufacturing and research division of the Consolidated Instrument Company of America, Inc.

This method of radio communication by means of the reed or visual indicator is superior in many respects to the aural beacon method of communication, which necessitates the use of earphones. Interference from other sound signals and from static has made the aural beacon less desirable, whereas, with the tuned reed indicator, such interference does not occur.

This instrument is called a tuned reed indicator because reeds, or thin strips of special metal, built with extreme precision so as to vibrate each to but a single frequency, are used to signal to the pilot that he is flying along his correct course.

The two reeds of this instrument, with flattened tips seen behind the glass front, both vibrate with equal amplitude when the plane is flying its course. As soon as the plane deviates from this course, one reed vibrates with a shorter amplitude, and this shortening of vibration can be readily seen.

The vibration of the faces of the reeds is visible behind the glass front as two short color bands of white. The shortening or lengthening of these bands of white is clearly visible. A direction for the pilot is written on the rim of the instrument case. It reads "Longest reed shows side off course." This is a perpetual suggestion to the operator of the plane that he is to steer so that his two reeds, shown as two color bands of white, will be vibrating equally. This means, too, that when the color bands of white are uneven, the pilot should steer toward the shorter reed.

One advantage of this reed indicator is that, with regard to direction through the air, it gives information that the compass does not and can not give. A compass of any type can, at best, only show the pilot the direction either north or south, or east or west, in which he is flying. But the compass cannot tell him his position in relation to his destination. Because of drift due to wind movements, a plane may, while keeping its compass direction, drift miles from its proper course. The drift hazard does not exist for the pilot who is using a reed indicator to follow a radio beacon course through the air.

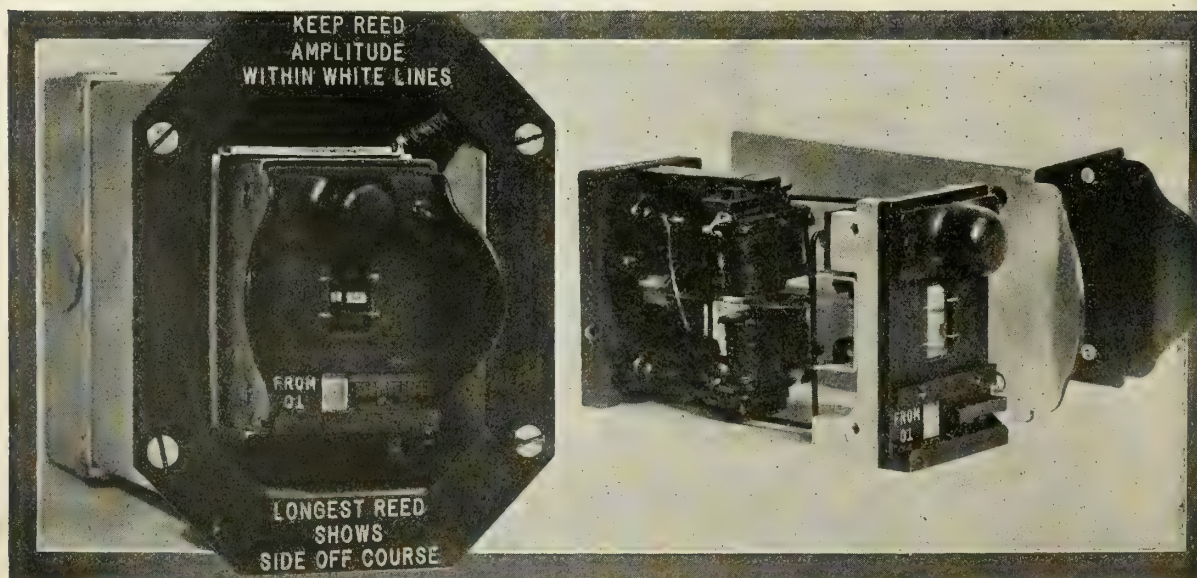
From flights made on the radio beacon course under various conditions, designs of reed indicator and shock-proof mounting were worked out. These flights showed that when ignition interference made aural reception almost impossible the reeds functioned satisfactorily, owing to their insensitivity to any frequency other than that to which they are tuned. For the same reason, other stations, such as the marine beacons, did not interfere with the operation of the reeds, the audio modulation of their signal being 1,000 cycles, while with aural reception trouble was often experienced from this source. One of the most valuable features of the reed indicator is that it gives a continuous indication to the pilot of his position

with respect to the course. This indication is obtained without any other effort than a glance of the eye. This feature is particularly valuable, since in time of fog, when the device is most needed, the pilot is very much occupied and can only glance at a course-indicating device occasionally. Granting that the pilot is certain that his altitude is correct, the radio beacon seen on his visual reed indicator enables him to fly securely through fog, snow, rain, or darkness.

The radio beacon, in connection with which the reed indicator operates, is a transmitting station which sends out 290-kilocycle waves on two loop antennae. These antennae are at right angles to each other, and the waves from one are modulated at a certain low frequency, as 85 cycles. A figure-of-eight characteristic is produced in space, and there are two lines (or four directions) along which the two modulated signals are of equal intensity. These directions are the courses where the two reeds of the visual indicator vibrate with equal amplitudes.

The reed indicator consists of a pair of metal reeds capable of vibrating between a pair of small electromagnets. These electromagnets are connected to the output terminals of the airplane receiving set. The frequencies to which the two vibrating reeds are tuned are the modulation frequencies supplied to the two transmitting antennae at the beacon station.

In the course of the experiments six types of indicators were constructed and data obtained on each. The final model, that which will be manufactured by Julien P. Friez & Sons, Inc., was one in which the reeds were made of steel with a bimetallic strip on the free end of the reeds for automatically holding the reeds in tune as the temperature varies. The reeds which are strongly polarized vibrate between two electromagnets taken from a telephone receiver. This form of indicator requires less than 1.5 milliamperes and 3.5 volts to operate the reeds with a 11 by 11 mm. damper on the end of the reed.

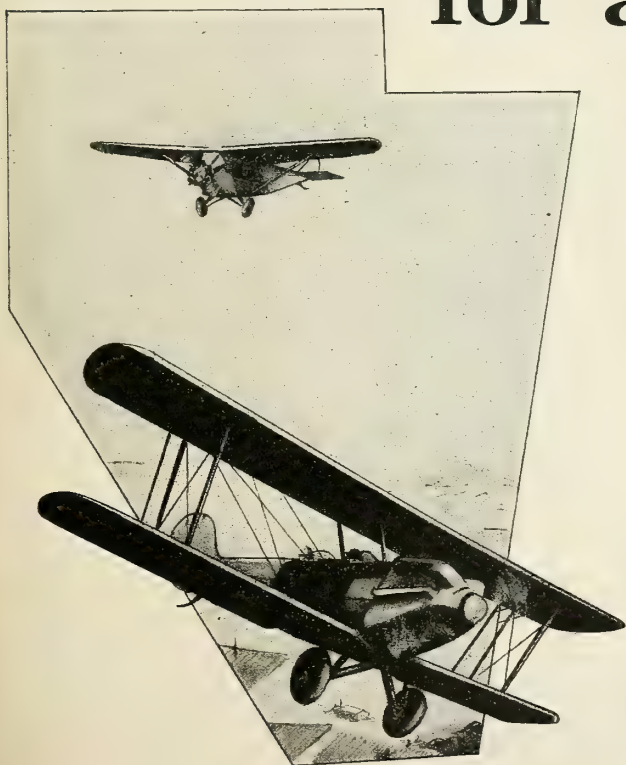


The type of radio beacon tuned indicator used by Lieut. Doolittle in his blind flying experiments

# ARMCO

## INGOT IRON

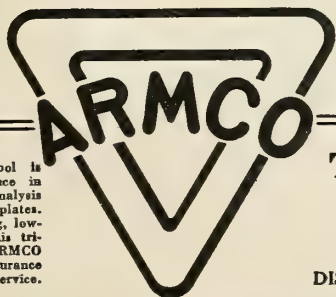
the *low-cost* sheet metal  
for aeronautical  
uses ~ ~



**F**UEL tanks that must be serviceable and dependable; exhaust pipe, strong and rust-resisting; firewalls that protect through the life of the plane; long-time covering for factory and port buildings—these are some of the places where ARMCO Ingot Iron serves and saves for the aeronautical industry.

Back of ARMCO Ingot Iron is the *longest record of actual service* of any low-cost rust-resisting sheets and plates. It is time-tested and proved.

Why not submit your metal problem to the nearest office?



Back of this familiar symbol is nearly thirty years' experience in the manufacture of special analysis iron and steel sheets and plates. When you seek a rust-resisting, low-cost metal be sure to see this triangle, and the words "ARMCO Ingot Iron." It is your assurance of dependable, economical service.

**The American Rolling Mill Co.**

*Executive Offices, MIDDLETOWN, OHIO*

**Export: The ARMCO International Corporation**

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	Cleveland	Philadelphia	San Francisco



# THE AIR SERVICES

## LARGE GRADUATION AT KELLY FIELD

THE advanced flying school at Kelly Field, Texas, graduated 119 students on October 12, the largest class of flying students since the World War. Normally the graduation of the October class occurs during the last week of that month. Excellent weather conditions at Kelly Field during the past summer made it possible for this class to complete the flying schedule several weeks sooner. The October class included forty-seven Second Lieutenants of the regular Army who graduated from the U. S. Military Academy in June, 1928. Seventy-one students received training under the status of flying cadet and one as non-commissioned officer. Within a period of sixteen months the Army Air Corps has graduated a total of 370 qualified airplane pilots.

During the course of instruction of the October class, cross-country flights were made by the different specialized sections. The Bombardment Section flew to El Paso, Texas, where members of the flight remained one day and returned to Kelly Field. The Attack Section flew from Kelly Field to Fort Crockett, Texas; then to Fort Sill, Okla.; from Fort Sill to El Paso, and return to Kelly Field. Cross-country flights to El Paso were also made by the Observation Squadron. The Pursuit Section flew to El Paso, making stops at Dallas, Muskogee and Fort Sill.

A REPORT listing purchases of aircraft, aircraft parts, aeronautical accessories and designs by the Navy Department during the last fiscal year has been submitted to the House of Representatives by Charles F. Adams, Secretary of the Navy. The report included the prices paid, the reasons for the awards to each company named, and the contracts awarded for rigid airships.

Among the purchases listed in the report

were: \$762,401 to the Pratt and Whitney Aircraft Company of Hartford, Conn., for 120 engines, and \$188,995 for spare parts; \$487,040 to the Chance-Vought Corporation of Long Island, for 37 airplanes, Model 02U-2; \$361,458 to the Wright Aeronautical Corporation of Paterson, N. J., for 86 engines; and \$556,800 to the Keystone Aircraft Corporation of Bristol, Pa., for 48 airplanes, model NK-1. Other items for planes, engines and spare parts were listed in the report.

## COAST GUARD HEAD REPORTS SUCCESS OF PLANE CHECKING

LIEUTENANT Commander Norman B. Hall, Chief of Coast Guard Aviation, recently reported that since the Coast Guard installed its system of aircraft checking no planes which availed themselves of this service have become lost in coastwise flights. The system was established in May, 1929, and consists of taking a record of the description of the airplane, its number, speed and time sighted, when it passes over each station. This information is forwarded to the next station which watches for its passage and records similar information which it forwards in turn.

Approximately 108 planes, both Government and privately owned, took advantage of the opportunity to have their flights checked during the month of July. Lieutenant Commander Hall asserted that a steady increase in the use of checking stations will be brought about when private plane owners realize the value of having their flights checked, so as to insure their location being known in case of accident. He also stated that an increase in its use will become apparent when pilots realize that the Coast Guard stations are actually fulfilling the same function as aircraft beacons, and, in addition, can furnish supplies, emergency aid and other assistance.

The Coast Guard is planning, after its service to pilots becomes well known, to furnish clear landing areas in inlets near its stations for the use of airplanes at night, so that pilots may land in safety and with the knowledge that boats and fishing traps are not in the way of a landing.

One hundred and thirty stations are now furnishing this service along the Atlantic coast from Montauk, L. I., to Miami, Fla., and additional stations will be established northward along the New England coast and on the Pacific and Gulf coasts when additional air traffic demands it, Lieutenant Commander Hall announced.

It was pointed out that this new service has the great advantage of being of no additional cost to the Government as it is rendered with personnel and equipment already available in the regular stations.

## AIR CORPS PLANES AT CIVIL EVENTS

THE War Department has issued regulations governing the participation of Air Corps personnel and planes in air meets, dedication ceremonies of airports and other civil aerial demonstrations. The large number of requests received for such participation has necessitated a limitation of those with which the War Department can comply without interference with training and other duties of the Air Corps personnel.

Under the regulations promulgated, Army aircraft is not authorized to participate unless the celebration has features of a military significance, or is connected with the dedication of a municipal, state or Federal-owned airport or landing field. The airport must be rated at least C3X by the Department of Commerce. Air Corps participation is not authorized on Sundays, national holidays or Armistice Day. The regulations also require the defrayment of personal expenses of the flying personnel and the supply of gasoline and oil for flying at the ceremony and the return journey.

Participation by Army personnel is limited to military maneuvers and is not authorized where other participants put on exhibitions of wing walking, trapeze work or changing from one plane to another. The aerial military maneuvers will be executed under the limitations of army regulations and will consist of an airplane formation over the field before landing on arrival and again on departure, unless exhibition flying is authorized and the sponsors of the celebration have furnished a bond of indemnity.

When the Air Corps has participated in the dedication of an airport it is not authorized to participate in the dedication of another later established in the same town or city, unless the first airport established is found unsatisfactory or is abandoned.



Recent graduating class at the Naval Air Station, Squantum, Mass.



A ~ COMPLETE ~ LINE ~ OF ~ AIRCRAFT ~ FOR ~ LAND ~ AND ~ SEA



Whether  
sky trails lead  
o'er land or water — an Emsco plane  
will serve you best.

## SPECIFICATIONS

Length Overall ..... 36 feet  
Span ..... 57 feet  
Height ..... 12 feet  
Fuel Capacity ..... 130 gallons  
Oil Capacity ..... 24 gallons  
Power ..... 3 Curtiss Challengers

## EQUIPMENT

Bendix brakes, Aerol shock-absorbing struts, Eclipse starters, Running lights and landing lights. All engine instruments with duplicate air speed indicator and altimeter in the cabin. All Emsco models are designed so that they may be equipped with Brewster pontoons.

ALL Emsco land planes are designed so that no structural changes are necessary to convert it to a seaplane. The pontoon fittings are built into the plane. The eight-place Emsco Challenger powered with three Curtiss Challenger motors of 170 h. p., each, may be easily transformed into a single-motored plane without sacrificing its exceptional performance.

Fittings for outboard motors are standard on the single-engined Emsco cabin monoplanes engineered for a Wright 300, a Wasp, or Hornet engine. Structurally the planes are identical.

Whether the single or multi-engined Emsco plane best suits your needs you have the assurance that you will be buying an all-purpose plane. You are assured that it has been engineered and built to give not only a full measure of trustworthy service but also that extra service which means increased usefulness and consequently greater profits.

Catalog and prices on request

**EMSCO**

EMSCO AIRCRAFT CORPORATION

DOWNEY CALIFORNIA



## NINE PY-1 PLANES ORDERED BY NAVY

THE Consolidated XPY-1 Naval Patrol Boat has been accepted by the Navy Department and nine of these planes have been ordered for delivery after extensive service tests at the Naval Air Station, Anacostia, D. C., and rough water tests at Hampton Roads, Va. The XPY-1, which is now known as the PY-1, was constructed by the Consolidated Aircraft Corporation of Buffalo to be entered in the open design competition held by the Navy in 1928. The first demonstration flights of the Consolidated PY-1 Patrol Boat were made at Anacostia on January 10, 1929.

The PY-1 in its preliminary flights indicated a high speed of 120 miles per hour. With full military load it took off in approximately 30 seconds and climbed to more than 5,000 feet in 10 minutes. Its service ceiling is 12,000 feet. The flying boat is of monoplane type with a wing span of 100 feet. Motive power is supplied by two Pratt and Whitney geared Wasp engines, carried in nacelles located underneath the wing, and driving two adjustable pitch propellers 10 feet 6 inches in length. It has a metal hull and is equipped with two Richardson type wing-pontoons.

### Inspection Division to Study Forced Landings

THE Inspection Division of the Army Air Corps is requiring a report of all forced landings experienced by pilots stationed at Army flying fields. Accompanying the report, there must be attached an analysis made by the authorities concerned at the field of the reported cause of the landing. By studying a mass of statistics gathered, the Inspection Division hopes to be able to discover the contributing factors in forced landings and make recommendations leading to their reduction or possible elimination.

Previously forced landings were seldom reported except to the home base, unless injury to the pilot or damage to the plane had resulted. Little information was available for a study of the causes with a view to preventing similar occurrences in the future. A forced landing is defined as one that is unpremeditated, whether it is caused by adverse weather conditions, failure of the airplane's structure or power plant failure.

### Naval Base to Be Developed Near New Orleans

A MILITARY and commercial airport for landplanes and seaplanes will be developed on the site of the Algiers Naval Station, according to a report from Ernest Lee Jahncke, First Assistant Secretary of the Navy. The airport, twenty minutes from New Orleans, is 4,000 feet by 2,500 feet. Funds are available for the leveling of the ground and the construction of hangars and ramps for landplanes and seaplanes. The Navy will operate planes at the base in conjunction with the Naval Air Station at Pensacola, Florida, which is 200 miles from New Orleans.

LIEUT. HEGENBERGER of the Air Corps has been assigned to the study of methods of navigating aircraft automatically by means of mechanical devices harnessed to an earth inductor compass. In this work, Lieut. Hegenberger will study the instrument boards from the *Spirit of St. Louis*, and the C-2, the ship Lieut. Maitland and Lieut. Hegenberger flew to Hawaii.

Lieut. Hegenberger's experiments and study are being made with a view to equipping aircraft with a mechanism that will provide automatic longitudinal, lateral and directional control and that will keep a plane on its course at all times.

### Sixty Reserve Officers Commissioned

SIXTY Army Air Corps Reserve Officers have been commissioned second lieutenants in the regular Air Corps and assigned to duty. They were appointed as the result of examinations held by the War Department last June.

The newly commissioned second lieutenants in the Army Air Corps were assigned to 11 fields as follows: Crissy Field, Cal.; Langley Field, Va.; 7; Marshal Field, Fort Riley, Kan.; 8; Selfridge Field, Cal.; 8; Post Field, Fort Sill, Okla.; 5; Maxwell Field, Ala.; 4; Mitchell Field, N. Y.; 4; Fort Crockett, Texas; 6; Fort Sam Houston, Texas; 4; and Wheeler Field, T. H., 1.

THE Secretary of War has authorized the attendance, without expense to the United States Government, of Capt. R. Rodas, Guatemalan Army, at the Air Corps Technical School, Chanute Field, for the Maintenance Engineering Course, which began October 15, 1929, and which will end April 14, 1930.

### Army Fourth Corps Area Field Maneuvers

THE Fourth Corps Area field maneuvers were held at Camp Jackson, S. C., from October 1 to 29. These maneuvers brought together at Camp Jackson a large concentration of all branches of the military service stationed in the Fourth Area, including Air Corps troops at Maxwell Field. The Twenty-second Observation Squadron and the Fourth Photo Section sent six airplanes to the maneuvers from Maxwell Field. Fifteen Air Corps officers traveled to Camp Jackson by air, and mechanics and other personnel made the trip in trucks. Upon the completion of activities at Camp Jackson the Twenty-second Squadron will proceed to Pope Field, Fort Bragg, N. C., where for two weeks the pilots will engage in the annual machine gun and bombing practice.

THE first trial of the mobile mooring mast was made recently at the Naval Air Station, Lakehurst, N. J., when the *Los Angeles* was successfully docked in a 90-degree cross-hangar wind which had a velocity of from 14 to 18 miles per hour. Further experiments with the mast included the undocking of the *Los Angeles* after towing it out of its hangar in a strong wind. The men generally employed on the bow lines were shifted to the stern lines as a portion of the mechanical equipment on the after lines was not installed.

## HELIUM PRODUCTION FOR THE SERVICES

THE new Government helium plant at Soncy, near Amarillo, Texas, produced 648,850 cubic feet of helium during July, of an average purity of approximately 97 per cent, the Bureau of Mines, Department of Commerce, announced recently. The first shipment of helium from the plant was made on May 6, and production has been steadily increasing since that date.

Production costs at the new plant will probably be within the previously estimated figure of \$20.00 per thousand cubic feet of helium. This is the lowest figure at which helium has ever been produced. Only a single unit of the plant unit is now in operation. When the second unit is completed, in the near future, the normal capacity of the plant will be far in excess of present Government requirements. With practically the same fixed charges, production can then be increased to any desired amount up to 20,000,000 cubic feet, or more, per year, and costs per thousand cubic feet of helium will depend on the amount of orders received.

The average cost of helium produced at the Fort Worth plant during 1926 was about \$34 per thousand. Compared with this figure, a cost of \$20 per thousand effects a saving of approximately \$36,000 in the helium required for a single filling of the *Los Angeles* and \$91,000 in the cost of the 6,400,000 cubic feet required to fill one of the big ships now under construction for the Navy.

Shipments of helium are now being regularly made from the Amarillo plant in specially designed tank cars to the Navy at Lakehurst, N. J., and to the Army at Scott Field, near St. Louis, Mo., and at Langley Field, near Newport News, Va., for use in the dirigibles operated by these services.

Before the World War, helium, which had been obtained only in small amounts as a curiosity in scientific laboratories, cost about \$2,000 per cubic foot. As a result of research by the Bureau of Mines, in cooperation with other Governmental agencies and commercial interests, production costs have been brought down to approximately 2 cents per cubic foot.

No other nation is able to provide its dirigibles with this non-inflammable gas, because supplies of helium-bearing gases in magnitude sufficient for large scale production have so far been discovered only in this country. Helium is extracted at the new plant from natural gas having an average helium content of approximately 1¼ per cent produced from the Clifside Structure lying northwest of Amarillo. Gas from 26,000 acres of land is available to the plant.

### Navigation Students to Make Long Flight

A 2,900-mile flight is planned by six students of the Army Air Corps advanced navigation school, Wright Field, Dayton, Ohio. Accompanied by an instructor and two civilian mechanics, the students plan to fly in two transport planes from Wright Field to the Gulf coast at the Mexican border, along the coast to Pensacola and back to Wright Field, making scheduled stops en route.



In every  
vocabulary  
of the air  
«



this word  
"CORSAIR"  
conveys a wealth of meaning  
«

FOR every word that finds its way into the specialized vocabulary of the air you'll find good reason. "Corsair," for example.

To everyone who flies or has flown military and naval ships "Corsair" means a ship with per-

formance that quickly ripens admiration for the plane into genuine affection.

All around performance . . . speed, ease of handling; rapid climb and the ability to get into and out of small fields with heavy loads . . . that's the "Corsair."

# CHANCE VOUGHT CORPORATION

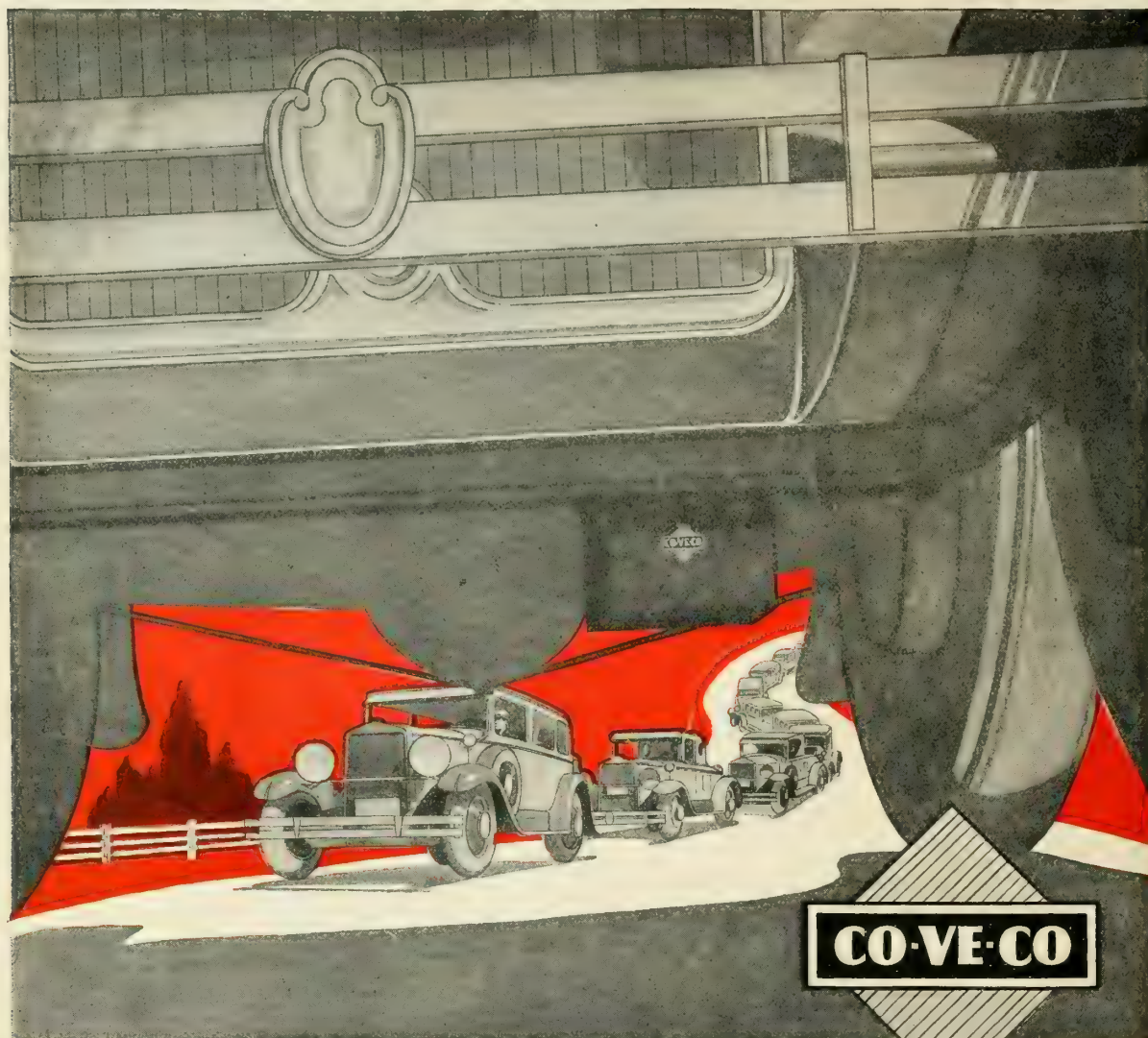
DIVISION OF UNITED AIRCRAFT & TRANSPORT CORPORATION

Long Island City, New York

Say you saw it in AERO DIGEST



# IN MILLIONS OF CARS



## CO-VE-CO STANDS THE ACID TEST

**U**NDERNEATH the seats of millions of cars is found a merciless testing laboratory for Co-Ve-Co Plywood. For years, Port Orford Cedar, from which Co-Ve-Co Cedar Aircraft Plywood is made, has been used by all leading storage battery manufacturers for battery separators. Submerged in acid, Co-Ve-Co again proves its superior lasting qualities, and probably is proving them in your car now!

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These same outstanding features are making Co-Ve-Co Aircraft Plywoods favored among aircraft manufacturers! Co-Ve-Co is not merely the trademark of plywood manufactured from Port Orford Cedar. It is the name by which you may recognize a fine Sitka Spruce Plywood and quality Aircraft Lumber as well. All Co-Ve-Co Plywoods bring you the natural strength of the forests. It brings you uniform cellular structure in every square inch. The exclusive Co-Ve-Co production method that eliminates "cooking" processes eliminates wood-fibre weakening and bursted fibres. Send for information, and then specify Co-Ve-Co Aircraft Plywood in your next order.

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## REARWIN AIRPLANES, INC.

FAIRFAX AIRPORT

KANSAS CITY.



### A SPLENDID OPPORTUNITY FOR AIRPLANE DISTRIBUTORS

The Rearwin "KEN-ROYCE", a three place bi-plane, is now in line production at our new factory in Kansas City, Kansas.

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The Rearwin "KEN-ROYCE" is the finished result of two years' intensive engineering effort to produce a high speed plane, with slow landing speed, outstanding economic efficiency, the ultimate of maneuverability, and proven factors of safety.

In take-off, climb, speed and controlability, the Rearwin "KEN-ROYCE" will out-perform any ship in its class. Notwithstanding its high speed of 142 miles per hour this remarkable plane lands at only 35 miles per hour! Amazing in its quick take-off, it climbs 1000 feet a minute, fully loaded.

Among the brilliant records of the Rearwin "KEN-ROYCE" in speed competition are the following:

- FIRST PLACE in the Miami-Miami Beach-Cleveland Derby at the 1929 National Air Races
- FIRST PLACE in the 1929 Petroleum Convention Air Races at Tulsa, Oklahoma
- 51 FIRST PLACES in the 1929 Kansas Air Tour Races

These are only a few of the outstanding achievements of The Rearwin "KEN-ROYCE" in 1929. All the above records were established by stock planes in competition with special-built racing planes of other leading makes.

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Complete information about this plan will be sent to you on request. It cannot fail to interest you if you want an airplane that will sell.

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The Rearwin "KEN-ROYCE" is the ONLY plane of its class that meets the demand of an enormous market of a definite and proven character. We have the plane that will sell, and we have the plan that will sell it for you. GET THIS PLAN.

## REARWIN AIRPLANES, INC.

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# *Creators of Ken Royce*



## BARKSDALE FIELD AT SHREVEPORT

**P**LANS for the development of Barksdale Field, the new Army Air Corps aviation field near Shreveport, La., are being completed, according to a recent announcement of the War Department. The field will be the base for the Third Attack Wing of the Army Air Corps. It is named for Lieut. Eugene Hay Barksdale, who lost his life on August 11, 1926, while flight-testing an observation plane near Dayton, Ohio.

Lieutenant Barksdale's name was selected from the names of three flying officers of the Regular Army who lost their lives in the service in line of duty, because of the outstanding service he performed both during the war while in France, and in this country in the years which followed. Lieutenant Barksdale was born in Mississippi on November 5, 1895, and graduated from Mississippi A. & M. College. Shortly after the outbreak of the war, he enlisted in the military service and joined a training camp. Transferred to the Aviation Section, Signal Corps, on July 15, 1917, he was sent to the School of Military Aeronautics, Austin, Texas, for ground school instruction. Shortly following his graduation from this school, he was sent to duty overseas. He received his flying and machine-gun training in England, and while serving with the Royal Air Force on the front, he received official credit for the destruction of three enemy aircraft. In addition, he participated in the destruction of five other enemy aircraft. He served with the 25th U. S. Aero Squadron from October 15, 1918, until his return to the United States in February, 1919. Until October, 1923, he served at

Mitchel Field, New York, and thereafter until his death at McCook Field, Dayton, Ohio, where he was on duty as test pilot.

The new home of the Third Attack Wing includes 20,210 acres of land near the Red River, which was donated to the War Department by the City of Shreveport at a cost of \$1,500,000. It is over twice as large as any other field of the Army Air Corps. The Department will make an initial construction investment of \$8,000,000 at the field, which, when completed, will house 1,536 officers and enlisted men with their families. Shreveport's Attack Wing, when fully organized, will consist of 196 officers, four warrant officers and 1,336 enlisted men. This personnel will maintain and operate 50 pursuit, 52 attack, six observation and two cargo airplanes. The Third Attack Wing brings to Shreveport one of the largest commands in the Air Corps. The units of the wing which have been already organized include those assigned to the Third Attack Group at Fort Crockett, Galveston, Texas.

Barksdale Field joins the paved Conshatta highway  $3\frac{1}{2}$  miles from the Shreveport business district. The entire area is 8 miles long and  $4\frac{1}{2}$  miles wide. The tract is divided into a flying and building field of 3,000 acres, and a bomb and machine gun range of 17,000 acres. The landing area of the field will give a three-mile runway in the direction of the prevailing wind, and a runway of  $1\frac{1}{2}$  miles at right angles to this in front of the hangar line. The bombing and machine gun range is in the form of a square approximately  $5\frac{1}{2}$  miles long and  $4\frac{1}{2}$  miles wide, extending beyond the airport and away from the city.

The soil of Barksdale Field consists largely of sandy loam which will take a good turf, as well as affording good natural drainage. The bombing, gunnery and maneuver areas will enable formations loaded with live bombs to take off from the air field, proceed to their objective, and drop their bomb loads without leaving the reservation, thus insuring safety to the civilian population. The nature of the terrain is such that any number of different types of targets may be erected to outline troops in bivouac under cover, on roads in the open, an advancing column partially concealed, and even water targets on Flag Lake, a body of water enclosed in the tract.

Barksdale Field is being established in accordance with the Air Corps five-year expansion program, under which the Air Corps has been operating since July 2, 1926, and which provides for a general scheme of distribution of the larger tactical units as follows: one bombardment wing on the West Coast, another on the East Coast, a pursuit group on the northern border and an attack wing in proximity to the southern border. Each group comprises a headquarters, three tactical squadrons and a service squadron.

### Extended Enlistment for Navy Flight Training

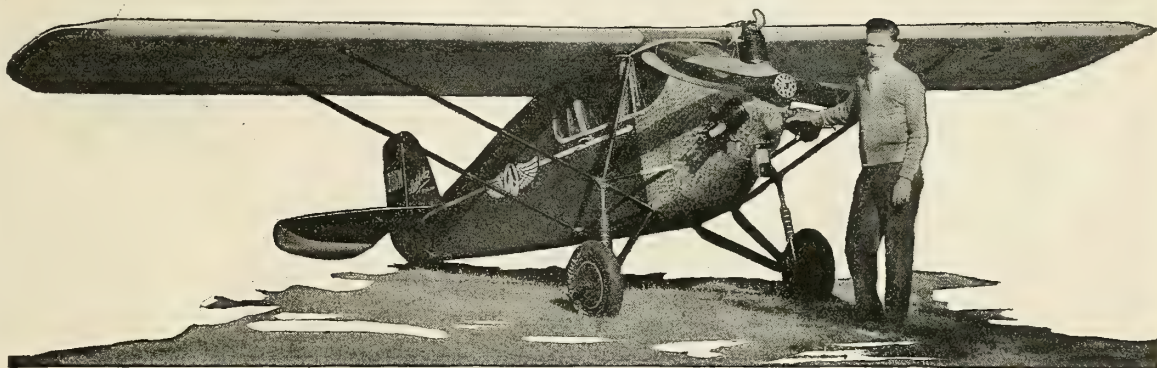
**B**ECAUSE of the cost and time required to train airplane pilots, the Bureau of Navigation of the Navy Department has announced that, when possible, men requesting flight training will be required to extend their enlistments so that on completion of their training they will have three years of obligated service. Where such enlistment is not possible, requests for training will be considered by the bureau for final action.



The site of Barksdale Field, future base of the Third Attack Wing, at Shreveport, La., with the Red River in the distance



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THE “Baby Ace” S. S. P. designed by O. G. Corben, a pilot who knows and realizes the need of the future—the plane for individual needs.

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To the individual who desires rapid, economical transportation in comfort—or the individual who desires to obtain more experience for a pilot’s license, no better means is obtainable than this remarkable, modern little ship.

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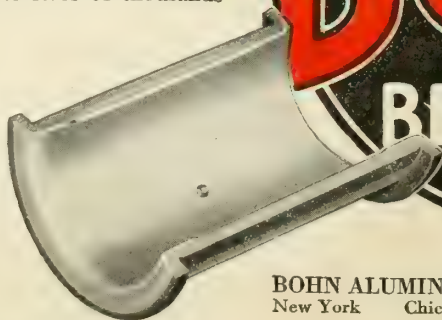




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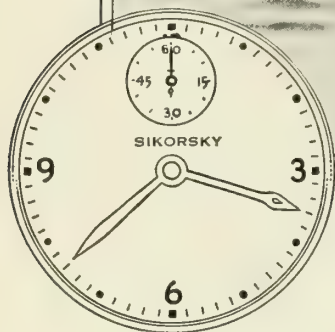
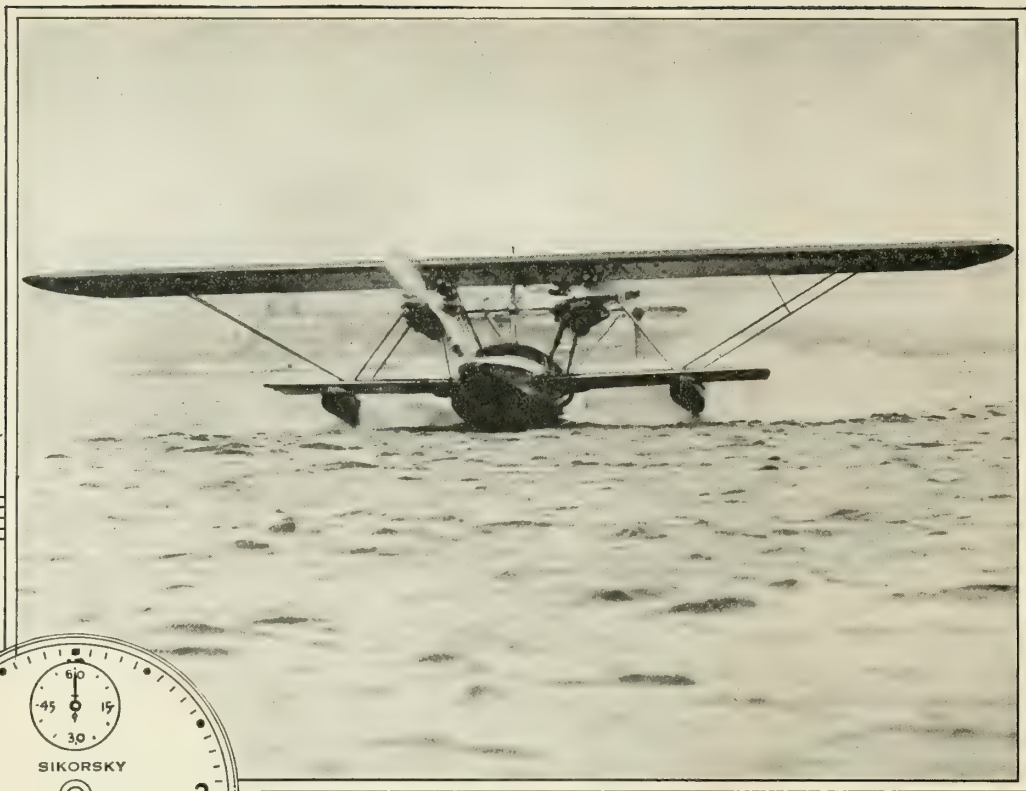
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## 3:38 P.M. . . . A perfect Seaplane takes off

Gun the "Wasp" engines on a Sikorsky Amphibian and an unusually short run picks her off the water. Ease back on the comfortable control wheel and her fast, easy climb cannot but stir your honest admiration. A gentleman's ship if ever there was one!

To state it even more definitely: A ship for men who know and love the water.

And yet you may want to land a dozen miles from water. Reach for that convenient landing gear control and in less than fifty seconds . . .





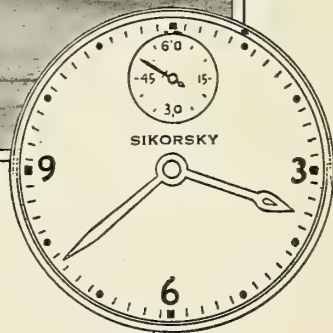
## 3:38:50 P.M. . and the Sikorsky "S-38" is an ideal land plane

The wheels slide down, moved by smooth, positive hydraulic control . . . and you have a ship completely at home under land conditions. The "S-38" is now equipped with Sikorsky designed brakes which bring her to a stop in less than 300 feet.

It is natural to think of the Sikorsky Amphibion as a ship of comfort and luxury . . . but it is interesting to be more specific. She has a ceiling, for example, of 18,000 feet, a cruising speed of 110 and a high speed of more than 125 miles an hour. She will fly . . . and maneuver . . . on either engine.

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Wins International Air Derby,  
Mexico City to Kansas City  
... Using  
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# INDEPENDENT



***Willfred G. Moore,  
in an Inland Sport  
Sets New Altitude Record  
for Light Planes . . . Using  
INDEPENDENT Gas and Oil***



**U**P . . . up . . . up . . .  
18,543 feet above the  
earth! A sweet-running  
motor that responded to  
every urge!

Pilot Willfred G. Moore, who set a new altitude record in United States for light planes at Kansas City, Oct. 1, not only had praise for his powerful little Inland Sport Monoplane, but for the fuel and lubricating oil he used.

He "Depended on INDEPENDENT" Tailwind Aviation Gas and Aviation Motor Oil. Again proving with *results* the high quality of these INDEPENDENT Products!

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# FOREIGN NEWS IN BRIEF

Compiled from reports from AERO DIGEST'S correspondents and the Aeronautics Trade Division, United States Bureau of Foreign and Domestic Commerce

## ENGLAND

**A**IRSHIPS will be used for advertising, surveying and passenger service by the Airship Development Company of England which has acquired the airship hangar at Cramlington Airport, Northumberland. The company will operate airships each of 60,000 cubic feet capacity, and 140 feet in length, fitted with 75 horsepower A. B. C. Hornet engines driving tractor propellers. Each airship will have a streamlined car similar to an airplane fuselage. Advertisements will be painted on large fabric banners on each side of the bag, and illuminated advertisements will be carried during night flights. Inauguration of a passenger service to any part of Great Britain or the continent is planned by the Airship Development Company.

**D**URING the first fifteen days of operation of the Hanworth Flying Club which opened recently, 17 members were sent up solo, nine of whom qualified for licenses, according to a report of the National Flying Services, Ltd., of London, England. With ten Moth planes available, 100 flying members have begun their courses of instruction. Two fields are maintained by National Flying Services, Ltd., one for flying instruction and the other for commercial operations. The levelling and rolling of the club field is practically completed, and the club hangar and gasoline station is ready for service. The other field, fully completed, is left free for use by commercial planes.

Besides instruction flying, air-taxi service is operated. The organization is not yet equipped with the two-passenger Desoutter cabin monoplanes which National Air Services, Ltd., intends to employ as the standard taxi machine in its activities.

**S**PONSORED by the Ford Motor Company, Ltd., of London and Manchester, a Ford trimotor all-metal transport has

made a demonstration flight through Europe, during which it was inspected and flown by numerous aeronautical experts representing both the government and private aviation interests of the countries visited. Eleven days were spent in Germany where the Junkers factory and the Zeppelin hangar at Friedrichshafen were included among the aviation centers visited by the personnel making the tour. Parker Vanzandt, foreign sales manager of the Ford airplane department, was in charge of the flight, and the plane was piloted by Leroy Manning, chief pilot of the Ford Company. The first exhibition of the Ford trimotor plane in Europe was held at the Olympia show in London.

## FRANCE

### Coste and Bellonte Set New Long-Distance Flight Record

**A** NEW unofficial long-distance record has been established by the French fliers Capt. Dieudonne Coste and Maurice Bellonte in an attempted non-stop flight from Le Bourget Field, Paris, to Tokio. Coste and Bellonte flew approximately 4,875 miles, or 375 miles further than the record set by the Italians, Arturo Ferrarin and Carlo del Prete, who flew from Rome to Natal, Brazil, in July, 1928.

Capt. Coste and Bellonte took off from Le Bourget Field on September 26 in their plane, the *Interrogation Point*, which carried sufficient fuel for 50 hours of flying. During the flight communication between the French government and officials in Siberia and Japan was maintained. On October 6 the French Ministry officially learned in a dispatch from Tokio that Coste and Bellonte had come down near a small village forty miles north of Tsitsihar, Manchuria, on September 29 when the fuel supply had become exhausted. The plane was slightly damaged in landing but the fliers were uninjured.

**T**HE French Committee for Aerial Safety is planning the organization of an International Congress for Aerial Safety to be held in 1930 for the purpose of coöperating with foreign governments in the realization of a reduction of aeronautical accidents. The congress would be of international scope and would promote the aerial safety program which has been outlined for France.

## POLAND

**U**PON the request of the Polish Committee on Aviation, the Caproni Company of Italy has agreed to accept the return of a Caproni machine purchased for a contemplated transatlantic flight backed by the committee, and to have a new plane of greater range ready for test flights next spring, according to a recent dispatch. After a study of unsuccessful attempts to fly the Atlantic from Europe to America, the committee concluded that a plane capable of longer sustained flight was necessary due to the prevailing headwinds encountered on a flight from east to west.

## CZECHOSLOVAKIA

**I**N 7,125 scheduled flights, covering 935,981 miles, the Czechoslovak State Air Lines, one of the two air transportation companies maintaining regular service in Czechoslovakia, carried a total of 13,197 passengers without a single accident during a period of five years ending 1928. There was no accident during the first half of 1929. During 1928 there were two forced landings, or an average of one forced landing for every 124,200 miles flown. The other airline, the Czechoslovak Air Traffic Company, had no accidents in 1928, the first year of its operation, during which 4,734 passengers were carried and 336,048 miles were flown over. The Air Traffic company suffered one accident during the first half of 1929 when a plane was forced down in a fog.



Ford Trimotor at Tempelhof Airport, Berlin, during its tour of European countries



## Aviation Insurance

You will find invaluable the splendid cooperation and extensive underwriting experience of the Independence Companies and the Aviation Assurance Agents of America—a nation-wide Independence organization with members located at leading aviation centers throughout the country.

When in need of any kind of aviation insurance it will pay you to get in touch with a member of the A. A. A. of A. or any other agent or broker of the Independence Companies. From any one of them you can secure complete protection as follows:

Fire, Theft, Cargo, Windstorm, Compensation, Property Damage, Accidental Damage, Damage to Ground Property, Public and Passenger Liability, Airport and Air-meet Liability, Delivery Flight, Blanket Policies and other specially constructed forms.



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HOME OFFICES, INDEPENDENCE BUILDING, PHILADELPHIA

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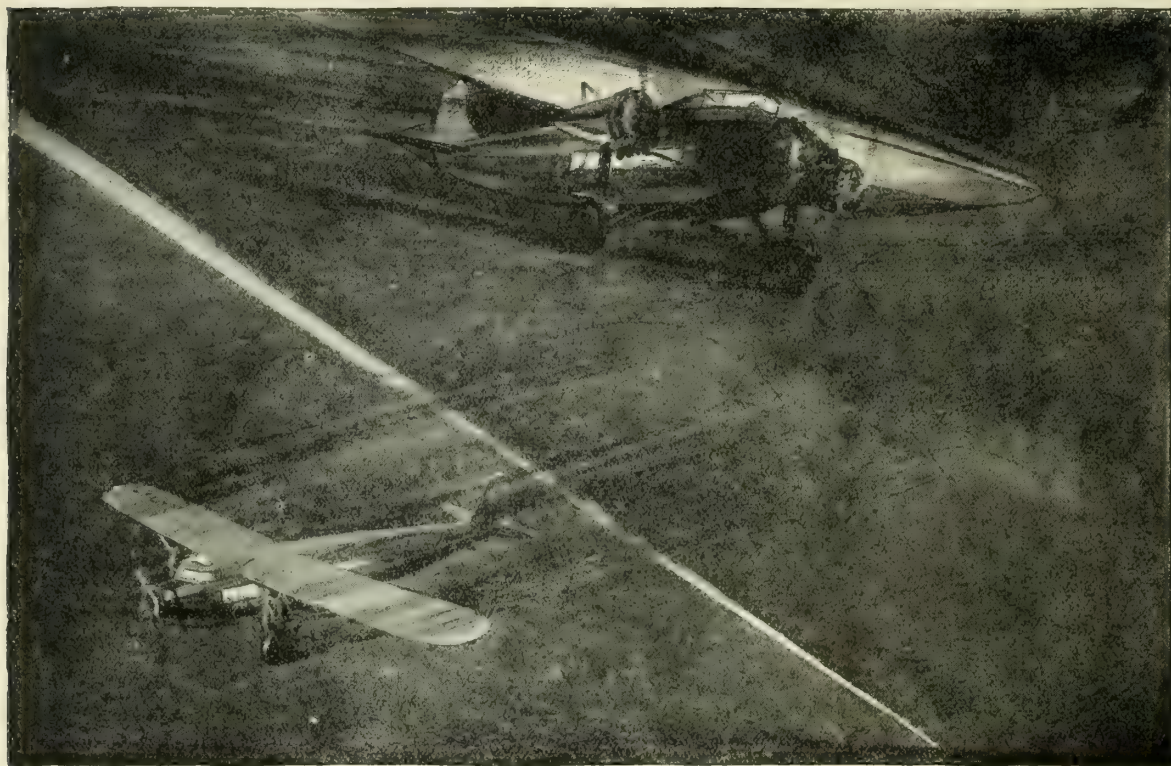
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Aviation Coverages



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-TP- Aero Motor Lubricating Oils are new—the latest development in scientific lubrication. They have been tested and approved by leading manufacturers of airplane engines and by many leading pilots. They are straight-run oils, not blended or compounded, produced from pure, paraffine-base crude by a process for which patents are pending.

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In terms of performance this means uniform viscosity at all working temperatures, minimum carbon deposit and ignition trouble from fouled spark plugs, easy cold priming, immediate oil pressure, perfect lubrication winter and summer, on the ground or at high altitudes—a maximum of safe flying hours.

A handsome, practical Pilot's Log Book sent free on request.

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TEXAS PACIFIC COAL AND OIL COMPANY  
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# -TP-AERO MOTOR LUBRICATING OIL

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## PORTUGAL

A NATIONAL Air Council of Portugal has been formed under the leadership of the Prime Minister to act as the sole organ for study and consultation concerning questions affecting national aeronautics. The council will meet every two weeks; and the secretary, chosen from the military aeronautical field, will submit data and problems to the body.

## ITALY

[CARLO DE RYSKY]

TRIAL-RUNS and inspection activities have been made over the Milan-Genoa and Rome-Tunisi airways by the S.I.S.A. and the S.A.M. concerns, respectively, looking toward the establishment of regular services over these routes. Completely equipped planes of recent construction will be used.

The S.A.M. firm has been operating the Brindisi-Athens-Constantinople airline since May 1, 1927. During that time planes on the route have flown 650,000 miles, and have carried 44,000 pounds of freight, 154,000 pounds of express, and 2,500 passengers.

THE Caproni Ca. 101 airplane was recently test-flown successfully. It is a three-engined monoplane, constructed entirely of metal. The Ca. 101 will be used for passenger transportation and colonial service. As a passenger transport it will be fitted with a 12-passenger cabin.

ALL Italian military airplanes are being replaced by planes of new construction and design, according to recent announcement of the Italian Undersecretary of State for Air, H. E. Balbo. Reconnaissance will be effected by type A.300-4 planes, equipped with new engines, and also by A.1205 and RO-1 type planes. Day bombing squadrons will use C.R.20 planes exclusively; and the night bombing groups will be equipped with Caproni planes of type C.73, modified by the elimination of the front machine-gun turrets.

Italian airlines now extend over 7,500 miles, according to the Undersecretary.

THREE types of planes, the Breda, Fia, and Macchi, have been declared winners of the Italian government's contest for tourist planes. The Italian government inaugurated the competition, limited to Italian-made machines, for the purpose of presenting several thousand of the winning planes to qualifying pilots as a civilian reserve air force. The Breda plane is powered with an Isotta-Fraschini 85 horsepower motor, has a cruising speed of 115 miles an hour, and can carry fuel sufficient for 500 miles.

COMMERCIAL air service between Venice and Brindisi was inaugurated recently by the Societa Transadriatic di Navigazione Aera di Venice. The bi-weekly service was inaugurated with four-passenger monoplanes with a single motor. The route will include Venice, Ancona, Bari, and Brindisi.

## AUSTRALIA

AUSTRALIA has a total of 50 airports throughout its country, 14 of which are licensed fields. These airports are located chiefly in the eastern and western states. Queensland has 15, New South Wales, 11; Western Australia, 16; Victoria, 7; and South Australia, 1.

### The Australian-made Plane, Lascoter

THE Larkin Aircraft Supply Company, Ltd., of Melbourne, Australia, recently completed its first production airplane, a six-place cabin high-wing monoplane. The Lascoter, as the plane is designated, has an all-metal steel tubular fuselage and is the first Australian-made plane to incorporate metal construction. It is powered with an Armstrong-Siddeley Puma engine, and has a cruising radius of 600 miles.

The metal fuselage is built in three distinct portions, a front end, cabin, and rear end, which are quickly detachable to facilitate transport. Immediately behind the engine is a fireproof bulkhead, with bushings through which all engine controls pass. A particularly strong type of rib is used, capable of a load of 600 pounds, and the wings are detachable at the fuselage. The fuel is fed by gravity from a central tank having a capacity of 80 gallons, permitting a non-stop range of 7½ hours at cruising speed. The equipment carried includes a luggage compartment, fire extinguisher, hand-starting magneto, compass, r.p.m. indicator, altimeter, oil pressure gauge, water temperature gauge, oil temperature gauge, air speed indicator, and tool kit. Different color combinations are optional by arrangement.

## JAPAN

THE first step toward the establishment of the mail and passenger airline which will join Tokio and Darien was made recently when air transport service was inaugurated between Korea and Darien by the Japan Air Transportation Company, Ltd. The new airport of Joito, near Seoul, was dedicated with the inauguration of the new service. The Tokio-Darien line, when put into operation, will include Osaka, Fukuoka, Urusan, Seoul and Heijo.

Two small type mail planes, each with a capacity of 265 pounds, taken over from the military authorities, are operating on a schedule of three flights a week in each direction between Urusan, Joito, Heijo and Darien; the entire distance of about 600 miles between Urusan and Darien requiring 7 hours in the air.

According to press dispatches this company has ordered twelve tri-motored air planes for use in the projected regular passenger and mail service between Tokio, Chosen and Darien. Appropriate airports and landmarks have been provided and emergency landing fields established. Equipment recently installed at Joito airport includes hangar, with concrete floor, 120 feet long by 90 feet wide, repair sheds, testing platform, airplane platform scales, compass correction stand, fuel tank and wind signals.

## CHINA

THE Aeronautics Department of the Chinese Ministry of Communication has drawn up a comprehensive plan divided into five projects for the early establishment of air mail lines throughout the country, according to a recent unofficial report. The first project is to combine the Nanking-Shanghai section of the Nanking-Kwangsi airline and the Nanking-Chengtu section of the Nanking-Tibet line into a direct route from Shanghai to Chengtu. The second proposal would combine the section from Kaifeng to Lanchow. It would also combine the section from Nanking-Heilungkiang line into a direct line from Canton to Mukden.

The third project would establish the Canton-Peiping line. A Nanking-Yunnan line is to be started. The northern section of the Nanking-Heilungkiang line will be continued and the section from Heilungkiang to Urga into a direct line from Mukden to Urga.

The fourth series includes the following: The Canton-Nanking section of the Nanking-Kwangsi line will be completed. The section from Lanchow to Tihwa of the Nanking-Sinkiang line will be finished.

The main work under the fifth plan is to complete all the other unestablished lines in the country. No mention, however, is made of international lines.

THE China National Aviation Corporation has been organized to operate and develop commercial aeronautics and air mail service in China. It is a government enterprise with a capital of \$10,000,000 and headquarters at Nanking. Air mail services between Nanking and Shanghai, Nanking and Hankow, and Nanking and Canton are planned.

## NEW ZEALAND

NEW airport ratings for New Zealand airports were announced recently by the Minister of Defense of New Zealand. For a No. 1 airport rating, in addition to basic requirements, the landing field must have a landing area of 800 yards in all directions with clear approaches. A No. 2 rating must have a landing area of 650 yards in all directions, a No. 3 rating requires 500 yards in all directions, and a No. 4 rating requires 400 yards in each direction with clear approaches in each case. A fifth rating will apply to such fields as do not qualify for the fourth.

## PERU

THE Peruvian Army Survey service, co-operating with the Cia. Aerea de Fotografia y Agrimensura is working under a five-year contract to survey large tracts of land in Peru. Surveys of 15,000 square kilometers were completed during the last two years in pursuance of a contract for the Irrigation Commission, the Empresas Electricas, the Municipalities of Lima and Calao, and for two private corporations. Some material and equipment for the Lima laboratories have been installed recently under the technical supervision of a staff officer.



## CANADA

**A**IRPORT facilities for both landplanes and seaplanes are practically completed at Saint John, N. B. A municipal landing field is located within the city limits and a seaplane station is three miles away at Millidgeville on the Kennebecasis River.

Approximately \$100,000 has been expended on the development of the Saint John Airport. It is surrounded by broad open land; air mail, commercial, private and student pilots are using the field. Sheltered water area is provided at the seaplane station. Equipment includes a landing stage, a slipway for drawing machines out of the water and arrangements for fueling planes. A good motor road enables travel to the center of Saint John within a few minutes.

### The Summer's Aviation Activities in British Columbia

[A. F. ROBERTS]

**A**FTER an unusually active summer season, British Columbia aviation is settling down to somewhat more restricted operations during the winter months. During the summer more planes flew in the province than ever before, chiefly on work connected with the development of natural resources.

Three machines—two Royal Canadian Air Force Fairchild cabin monoplanes and one Western Canada Airways Junkers—operated on photographic surveys for the British Columbia government in the Peace River area. During the summer they photographed 12,000 square miles of territory, making their base at Prince George. All three were on floats. Four other machines were operated by Western Canada Airways in the province—three Boeing flying boats on fishery patrol and contract work on the coast, and one Fokker Universal on freight carrying to the mining areas of central British Columbia out of Prince George. Dominion Airways, Ltd., of Vancouver had three planes in service, one DeHavilland Moth seaplane operating on forestry patrol out of Nelson and two others in constant use at the company's school in Vancouver. In addition to these the Aero Club of B. C., Vancouver, had two Moths and later two Eaglerocks in use at the city's temporary airport, and the Sprott-Shaw School of Aviation gave instruction in a Waco biplane.

The summer was marked by numerous aerial crossings of the Rockies—a flight attended with much more risk than that over the lighted and marked transcontinental route in the United States. There are neither emergency landing fields nor air beacons to guide the flyer through the Canadian Rockies.

The southern B. C. route through the Crow's Nest Pass was used by all planes. First, Mr. L. M. Lockhart's tri-motored Fokker flew in almost a straight line from Vancouver to Calgary over the mountains at 14,000 feet in four hours and 35 minutes. A month later Mr. and Mrs. Hal Hart flew from High River to Vancouver, with a stop at Grand Forks, in their Waco Taper-Wing.

Then a few days later a Western Canada Airways trimotor Fokker piloted by W. L. Brintnell made a flight from Winnipeg. Premier John Bracken was one of the passengers. The machine made the return trip over the same route. Capt. J. D. Parkinson of Montreal, holder of the Canadian altitude record, recently completed a trans-Canadian flight in his Curtiss Robin, flying from High River to Vancouver with stops at Grand Forks and Princeton.

Other features of the summer's activity in Vancouver included the establishment of the Boeing Airplane Company's only branch factory, formation of a glider camp for next summer, and organization of a model aircraft league for boys.

Plans for Vancouver's permanent airport on Sea Island, for which ratepayers voted \$300,000 purchase money in the spring, were advanced during the summer and actual construction work will be well under way by the middle of the winter.

## MEXICO

[MONT HURST]

**T**HE Cia. Mexicana de Aviacion will construct two weather stations near Pachuca in the near future in order that the velocity of winds, prevalence of clouds and fogs may be reported to both Mexico City and Tampico. One station will be built on top of a mountain and the other in the valley near Pachuca. Victor Phillips, connected with the U. S. Weather Bureau at Brownsville, inspected the district around Pachuca and suggested that the two stations be constructed.

One-half of the planes of the Cia. Mexicana de Aviacion are now equipped with radio sending and receiving sets. They keep in constant communication with the three ground stations of the company. T. S. McCaleb, engineer in charge of radio installation for the company, plans the installation of more sets on planes in the future. A weather station will be built on the line about midway between Tampico and Mexico City. Weather reports in the Sierra Madre mountains will be recorded and furnished pilots, and another station will be built at Soto la Marina soon. A new radio station has just been completed at Vera Cruz.

Arrangements have been made by the Cia. Mexicana de Aviacion to convert the Tejeria-Guatemala City air mail route into a mail and passenger service line.

**T**HE Inter-America Aerial Transport Company will build a new aviation field in Vera Cruz, according to an announcement of C. Jofre, president. The field will be constructed by Eulalio Vela and Pedro Pablo Remero in the Las Olas colony at El Sardinero.

**A**S soon as minor points of the contract with the government have been worked out service will be started on the airline from San Luis Potosi to Guadalajara, and to Torreon. Three Bellanca planes are already in San Luis Potosi in connection with the new line.

**A**RRANGEMENTS have been completed between the Martin Engineering Company and the Cia. Mexicana de Aviacion for the improvement and enlarging of the airport at Tejeria, Mexico. An additional hangar is being constructed and the airport will be enlarged considerably; runways will be lengthened and widened and border lights will be placed. An administration building will also be constructed at the field.

**A**REGULAR air mail, and passenger line has been established between Mexico and Guatemala by the Latin-American Transport Company. Juan Lopez, postal inspector, has made a trip over the new route and conducted an inspection. A route is now proposed to El Salvador.

## CHILE

### Military and Commercial Airports in Chile

**M**ODERN airport facilities and equipment are not generally available in Chile, and commercial landing fields are ordinary fields practically undeveloped. Visiting fliers are permitted to land at all commercial airports in the country; these are located at convenient points throughout Chile and are marked with a large capital "T" for identification from the air. Permission must be secured from the Chilean Ministry of War to land at the principal military airports located at El Bosque and Iquique.

The field of Santiago, Chile, is about six miles from the city at El Bosque. It has a runway of 2,000 yards in length and 900 yards in width. Army flying schools and mechanical shops are located at one end of the field, and adjacent are the hangars for government planes and the administration building. The four sides of the field and the buildings are illuminated. The flood type of night illumination is not used.

The field at Iquique is a military airport, located about seven miles from the city and beyond the coast range of mountains at an elevation of 2,000 feet. The field is approximately 1,100 yards by 900 yards and is soft natural sand, clear of rocks. Three hangars have been constructed and are equipped to handle about 15 planes. There are also administration buildings, barracks, officers' quarters, hospital, a mechanical shop and telegraph offices. American aviation gasoline and oils are available. There is no illumination at the field for night flying.

The flying field at Copiapo is about three-fifths of a mile outside the city. It is equipped with hangars having space for six small planes and a service station for repairs, gasoline and oil. The runway is 1,100 yards by 700 yards. There is telegraphic communication with nearby towns.

The Penuco airport, 468 miles from Santiago, is a small field equipped with a hangar which accommodates about ten small planes.

In addition to these principal landing fields the government has constructed other fields near Ovalle, Autogasta, Talca and Rancagua. An army aviation base at El Salar de Carmen is available for civil and commercial aviation.



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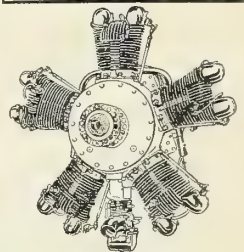
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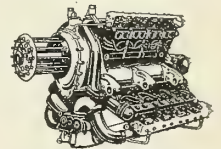
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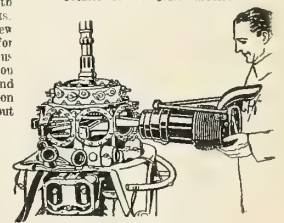
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# PROGRESS of the LUFT HANSA

By EDWIN P. A. HEINZE

**T**HE Deutsche Luft Hansa is undergoing a complete reorganization because the government subsidy was reduced rather suddenly at the beginning of this year. Last year the Luft Hansa received nearly twenty-two million marks; the company this year will receive only ten and one-half million marks.

The reduction, coming more or less as a surprise, necessitated a complete change of policy and almost led to a collapse of the service. Critics of the organization tried to prove that it was futile to develop the airways from the public funds, and that air traffic in Germany is a luxury. The supporters of the Luft Hansa pointed out that no new means of public transport ever introduced could from the start pay for its upkeep, and that the development of air transport in Germany is so satisfactory as to prove beyond doubt its necessity and its importance in the economical life of the nation.

Because of the uncertainty respecting the amount of the subsidy, the Luft Hansa was handicapped in its publicity campaign, and no little damage was done to its prestige in the eyes of the general public. Criticisms of the press during the budget meetings of the Reichstag created an unfavorable impression, with the result that during the first few months of service this year the number of passengers carried was thirty per cent less than in the same months of last year. Only gradually has the number of passengers increased to last year's figures.

To bring the expenses of the company within the limits of the reduced subsidy, it has been necessary to give one-third of the employees notice to quit service. Despite this reduction of the staff, it has been found possible to reduce the actual flying service by only ten per cent, although nineteen out of ninety-nine lines were given up. The maximum distance now flown is 34,500 miles per day. Many of the least paying lines have been taken out of service.

The daily mileage flown by Luft Hansa planes has been cut down by 15.7 per cent. Considerable saving has also been effected by lengthening the periods of service between each complete overhaul. In the case of the planes, these periods have been ex-

tended fifty-five per cent, and in the case of motors, twenty-one per cent. The service period of instruments was doubled. During 1928, nine large, seventeen medium sized and two special mail ships were commissioned. Four new types of engines, two of them air-cooled and developing more than 400 horsepower each, were tested and certified for service in Luft Hansa ships, and twelve older types were dropped. This reduction of types simplifies service and means savings in the stocks.

It may be pointed out that the ratio between income and subvention received by the Luft Hansa has progressed favorably. In 1927 the Luft Hansa earned 26.7 per cent, as compared with 31.8 per cent in 1928, of the money required to carry through its work. This year it is expected to achieve a further improvement.

A definite development has taken place in regard to the mail service on the Luft Hansa lines. Hitherto mails were carried by passenger or freight machines on the regular lines. The German Post Minister has now come to an agreement with the Luft Hansa for the establishment of special and exclusive mail lines. Two such lines (namely, Berlin-London and Berlin-Stockholm) are already in service, and several new ones are planned for 1930.

The freight services have developed very favorably. Special rebates have been granted to large freighters such as the I. G. Farben, Krupp, Association of Flower Wholesalers, Union of German Silkweavers, and many others. Every day a ton of flowers from Amsterdam is landed at Berlin, and one and one-half tons of various goods arrive from London by the regular lines. Although the mileage of the mixed passenger and freight service has been reduced, the transported weight of goods during the first half of this year has increased by fifty per cent over that of the same period last year. The mileage of the lines devoted exclusively to freight carrying has been increased by forty per cent, and the total freight carried has increased 100 per cent. During this year the Luft Hansa has organized services to India, Persia and North Africa in conjunction with foreign companies.

The Luft Hansa company still calculates

passenger fares on the basis of slightly less than six cents per mile. In the case of the international lines seven and a half cents are charged.

The present subsidy sums have been granted annually until 1931. The company will in the future receive subsidy in the form of money rather than in supplies and will be in a position to make its purchases in keeping with its own policy. The company has been given a much freer hand in arranging its service and organization, but is, of course, still bound by many obligations towards the various states and cities that are shareholders. It is mainly for this reason that some lines that do not pay must be kept going. Nevertheless, the company is going on with the working out of future programs and the preparation of new services. One of the big aims of the company is the organization of trans-oceanic and transcontinental services.

For the transatlantic work, the Luft Hansa receives special funds which, starting next year, will be given in the form of a loan. This year these funds are granted from the funds of the supplementary budget. These lines will be the first to pay for themselves, according to Luft Hansa officials, and work on them is progressing rapidly. The first service is planned to South America and later to North America. A good start already exists in the South American Condor Syndicate which operates lines along the Brazilian coast from Rio de Janeiro to Rio Grande. This company is associated with the Luft Hansa, which also shares in the Spanish services. The latter participation is especially useful, for the German company thus has a base of operation in Spain that is very important for the future transatlantic service. Important pioneer flights from Berlin to Sevilla with a single stop at Marseille have already been executed. The pilot, Herr von Schroder, who flew an Arado mail ship, required only between 13 and 14 hours to cover the whole distance.

Though the trans-oceanic service is not yet possible, the transcontinental services could be established without technical difficulty. But political impediments, especially the Russian-Chinese conflict, stand in the way. The services to the Near East—to Moscow and Stambul (Constantinople)—are going well. They are being flown by large trimotor planes which cover more than three million miles a year.



A Junkers G31 transport monoplane and a Dornier Super-Wal flying boat used on lines of the Deutsche Luft Hansa

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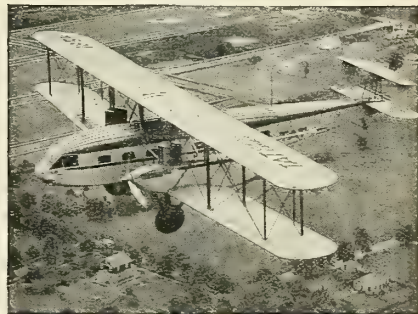
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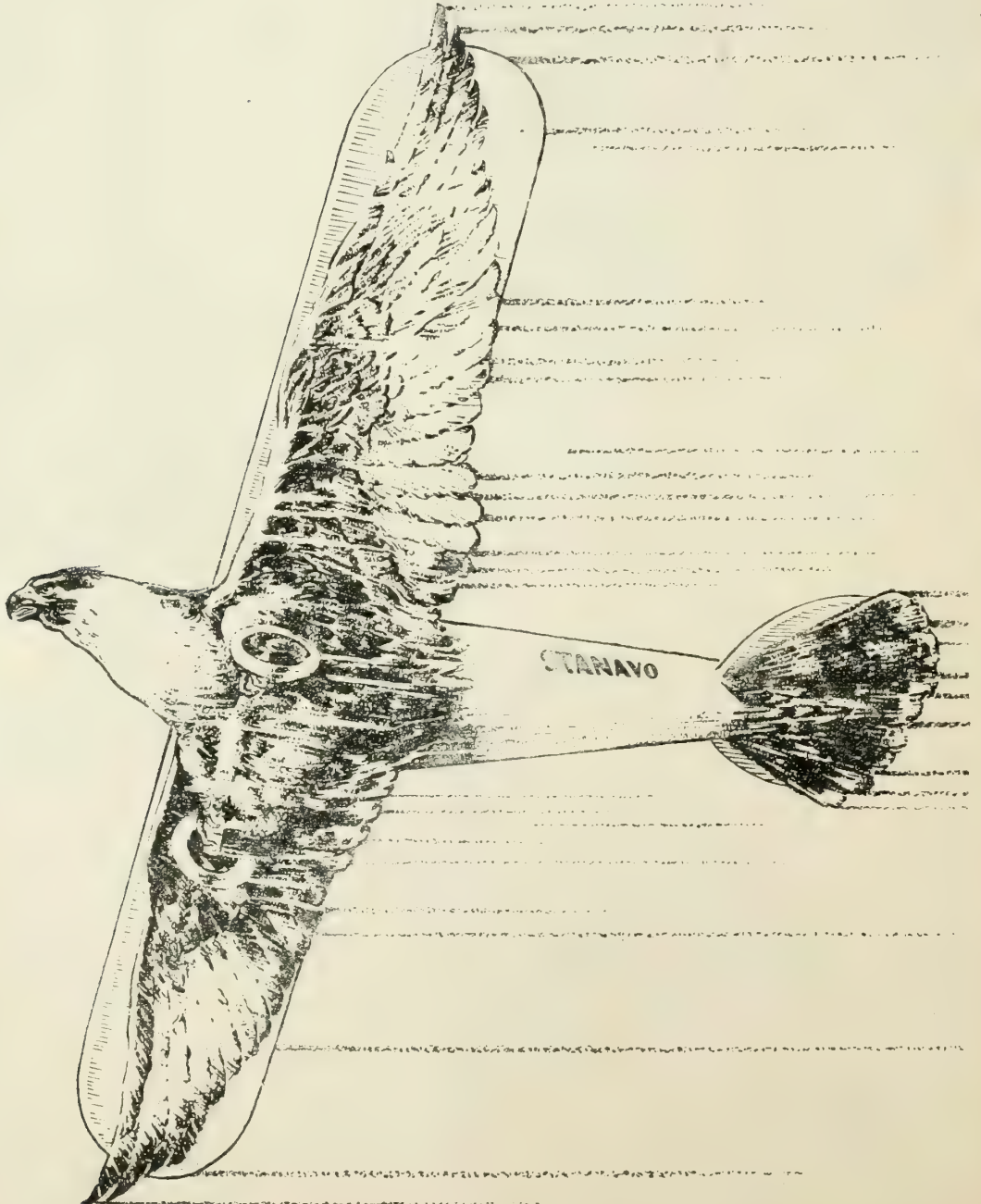
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# WESTERN NEWS

## RUSSIAN FLIERS REACH AMERICA

**E**N route from Moscow to New York on a good will tour, the Russian plane *Land of the Soviets* arrived at the Oakland, Cal., airport on October 19. The plane left Moscow on August 23 on the flight to America, the route being laid across Siberia, the North Pacific, Alaska, Seattle, Washington, and then to New York by way of San Francisco and Chicago. The pilots are Semyon Shestakov, Russian ace who flew from Tokio to Moscow and return in 1927; and Philip E. Bolotov, co-pilot. B. V. Sterlinger is navigator, and D. V. Fyfyoff, mechanic.

The *Land of the Soviets* flew from Moscow across Siberia and approached Alaska by way of the Aleutian Islands. The fliers landed in rough water at Dutch Harbor, Unalaska Island, and beached the ship with the aid of the United States Coast Guard. The plane was threatened by severe storms on the next leg of the flight to Seward, Alaska. The flight from Seward to Sitka was negotiated without incident, but the fliers were forced down at Waterfall by engine trouble on the route from Sitka to Seattle. A new engine was installed and the *Land of the Soviets* resumed its flight, arriving at Seattle on October 13.

The flight was delayed at Seattle while landing gear was substituted for the pontoons with which the plane was equipped. During their stay in Seattle, the Russians were entertained by members of the aviation committee of the Chamber of Commerce.

A welcome was accorded the Russians when the *Land of the Soviets* arrived at the Oakland, Calif., airport.

The *Land of the Soviets* is an all-metal monoplane powered with two 600-horsepower engines located on top of the wing on either side of the fuselage, which is above the wings. The plane was manufactured by the Central Aero Hydro-Dynamic Institute of Moscow and was designed by A. N. Tupoloff, aviation engineer for the Institute. It has a flying range of approximately 1,430 miles.

## NEW FOKKER PLANT AT LOS ANGELES

**T**HE Fokker Aircraft Corporation will erect a \$300,000 factory at Los Angeles for the construction of the new Fokker F-32 four-engined passenger transport.

The new factory will be constructed on a 33-acre tract adjoining the Alhambra Airport of the Western Air Express. The factory will employ 500 men at the start and expand its force as other factory units are added. As soon as the factory is completed, it will go into production, producing one of the big transport Fokker F-32 ships every week. It is probable that this schedule will

be doubled within 18 months. Western Air Express, of which Mr. Hanshue is president, has ordered six of the new transport planes, which will be placed on the Western Air Express routes between Los Angeles, San Francisco and Kansas City next spring.

## California Press Adopts New Policy on Accident Stories

**A** RESOLUTION urging the press to carry the complete facts in airplane accident stories was adopted at a recent meeting of the California Newspaper Publishers' Association held at Orange, Calif. The resolution urged that airplane accidents stories contain whenever possible, the name and type of plane, whether or not it was licensed by the Department of Commerce, and whether the pilot and plane were licensed to carry passengers for hire.

## WESTERN AIRCRAFT SHOW—NOV. 9-16

**P**LANs for the first annual Western Aircraft Show, to be held in Los Angeles from November 9 to 16, are actively under way with Cliff Henderson as managing director. More than 100,000 square feet of floor space will be provided for the exhibits at the Los Angeles display. The show will be located at Wilshire Boulevard and Fairfax avenue, Los Angeles, where an exhibition hall is being remodeled and enlarged to display sixty or more airplanes, with space for airplane accessory booths.

Sixty thousand square feet in the center of the building will be given over to airplane exhibits, and about this space will be a continuous series of accessory booths. Headquarters for the event have been established in the Ambassador Hotel at Los Angeles. The Western Aircraft is sanctioned by the Aeronautical Chamber of Commerce of America, Inc., as a Class B show and is managed by that organization in cooperation with the California Aircraft Exposition Corporation.

Members of the executive committee of the show are Fred Worthey, Frank Birely, W. E. Thomas, Robert J. Pritchard, C. W. H. Smith, D. E. McDanel, Harry Wetzel, and Waldo Waterman.

## SPEICH SETS NEW ENDURANCE RECORD

**V**ERNE SPEICH recently established a new solo endurance record of 38 hours and 48 seconds, breaking by more than an hour the former record held by Lieut. Herbert J. Fahey. Speich took off from the Long Beach Municipal Airport in a Zenith monoplane powered with a Wright 225 horsepower engine and carrying 453 gallons of gasoline.

## Flying Club of Calif. at Los Angeles

**F**OUR acres of land and buildings on one corner of the Grand Central Air Terminal, Glendale, Cal., have been leased by the Flying Club of California for the establishment of a club house and grounds. The project is fostered by Captain C. C. Spicer and his associates, developers and builders of the Grand Central Air Terminal. Organization of the Club began in June of this year.

The Grand Central Air Terminal, Ltd., has leased the property and buildings to the Club for a period of twenty years. Under the terms of the agreement, the airport management cleared the ground and built the club house and other facilities, which has involved an estimated expenditure of \$200,000. The club corporation operates the property, and any profits accruing from its activities are the property of the club. Part of the proceeds from the sale of memberships, which are limited to 1,000, are used to equip the building, which will cost approximately \$40,000.

The club house and grounds are situated on the corner of the cross runway of the Air Terminal, fronting both the field proper and Victory Boulevard. The club and airport are fifteen minutes from Hollywood and twenty minutes from the business center of Los Angeles.

A modern steel hangar is provided for those owning planes. Repairs, service and other airport facilities are available. Weather reports, maps of all parts of the west showing emergency landing fields, landmarks and other information is also supplied.

Among the officers of the California Flying Club are: Dr. T. C. Young, president; William S. Belt, first vice president; Dudley M. Steele, second vice president, and D. E. McDanel, treasurer.

## Aero Corp. of Calif. School Completes Sixth Year of Operation

**T**HE Aero Corporation of California school of aviation recently held a banquet celebrating the completion of its sixth year of operation. The aviation school, established at Los Angeles in 1923, was among the first five in the United States to be approved and receive an accredited rating

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(Continued from preceding page)

from the Department of Commerce. Approximately 1,500 students have completed training and graduated from the school during the past six years. The present training equipment consists of 18 planes. The Aero Corporation of California school of aviation operates a ground school in connection with the flying school.

#### Changes in Kreutzer Organization

**C**ONTROL of the Joseph Kreutzer Corporation, manufacturer of the Kreutzer Tri-Motor Air Coach, has been acquired by Howard Throckmorton, president of the Valley Portland Cement Company, Los Angeles, Cal. Mr. Throckmorton has retained the services of the group which formerly controlled the Kreutzer concern and added several new executives to the official personnel. The new board of directors is as follows: Joseph Kreutzer, chairman of the board; Howard Throckmorton, president and treasurer; E. Milton Jones, vice-president; C. W. Williamson, secretary; J. C. Howard, George G. Blymeyer and Nathan Newby.

#### Student Prince Training and Sport Plane Test Flown

**T**HE first test flight of the Student Prince biplane was made recently at the Swan Island airport, Portland, Ore. The plane was designed by Lieut. Basil B. Smith, U. S. N. R., and is manufactured by the Aircraft Builders Corporation of Portland, which is controlled by the First National Flying Systems, Inc. In its test flight, the plane was flown by Lieut. Smith and J. Kergerris, president and general manager of the Aircraft Builders company.

The Student Prince is a two-place biplane, powered with a Cirrus Mark 111 engine.

#### Santa Barbara to Have Airport and Air Service

**T**HE Exchange Club of Santa Barbara, Calif., has adopted the report of the aviation committee recommending the selection of Casa Loma Field as a municipal airport and the adjacent Goleta and Serens fields as training and storage grounds. Casa Loma Field is owned by Earl Ovington. Officials of Maddux Air Lines have promised air service for Santa Barbara as soon as the airport is approved and developed. The operating firm plans to provide service connecting Santa Barbara with Los Angeles and San Francisco.

## BOEING SCHOOL OF AERONAUTICS

**W**ITH an enrollment of 126 students the Boeing School of Aeronautics of Oakland Municipal Airport, Oakland, Calif., had all of its classes filled two weeks after its opening on September 16, according to T. Lee, manager. The school offers courses in flying, ground school and associated subjects, which range from a private pilot's course consisting of thirty-five hours' ground work, ten hours dual flying instruction and eight hours solo, to the Boeing master pilot course which includes 864 hours of ground school and 200 hours of flying, requiring nine months for completion.

The Boeing School of Aeronautics is located in Hangar No. 5 at the Oakland Municipal Airport. The building is a new concrete and steel hangar and administration building built for the Boeing school by the Oakland Port Commission. The field includes 845 acres, and is the base for the activities of the Boeing System in the San Francisco Bay district. The School has purchased three additional Boeing Model 203 training planes from the Boeing Airplane Company since its opening and the school now has nine planes for flight instruction, six Boeing training planes, one Hamilton eight-place metal cabin plane, one Boeing 40-B mail-passenger plane, and one Stinson Junior cabin plane. There are now five different types of airplanes in its laboratory for instruction purposes.

Although the courses at the school are now filled, additional registrations will be received on Nov. 15 when flying students will be enrolled, and will be able to take certain ground courses. In January other classes will be started.

The courses offered by the Boeing School of Aeronautics are as follows:

Private Pilot: 35 hours of evening ground school and 18 hours of flying—10 hours dual and 8 solo. This course is completed in approximately two months. Limited Commercial: 70 hours of evening ground school with flying course consisting of 25 hours dual and 25 hours solo and requiring three months. Transport Pilot: 140 hours of ground school given during twenty weeks evening school session or during five weeks summer session. Flying course includes 50 hours dual and 150 hours solo. Special Master Pilot: This course is open to holders of transport licenses and provides train-

ing in the operation of large planes as used in air mail and passenger transportation. It includes 32 hours of flying and is completed in one month. Airplane and Engine Mechanic: 140 hours lecture, laboratory and shop instruction in subjects necessary to the airplane and engine mechanics. Completion requires twenty weeks evening school or five weeks summer session. Boeing Master Pilot: 864 hours in 22 ground school subjects, completed in nine months of day school. The flying course consists of 50 hours dual and 150 hours solo and includes instrument and night flying in transport planes. Master Mechanic: 1008 hours of instruction in twenty-two subjects covering manufacturing and field operation. It is completed in nine months day school.

The officers of the Boeing School of Aeronautics are T. Lee, Jr., general manager; H. F. Lusk, dean; George Myers, chief of the flying service; W. E. Wright in charge of shop work; J. Milton in charge of welding and class instruction; and C. O. Brinklinger, service and maintenance superintendent.

## CONTACTS

[F. E. SAMUELS]

**C**ADEN JENKINS, former secretary of the Aircraft Operators Association and the California Aircraft Industries Association, has been appointed as special representative in charge of sales promotion for the Aero Corporation of California, with headquarters in Los Angeles. Mr. Jenkins has in the past represented the aviation industry at the California State Capitol during the passing of aeronautical legislative matters. He is a lieutenant in the U. S. Air Corps Reserves.

**T**HE opening of the Standard Airlines new airport at El Paso, Texas, on October 6th was attended by over 5,000 persons. Among the notables present were Mayor R. E. Thomason of El Paso, Brig. Gen. C. J. Symmonds, commanding officer at Fort Bliss, General Francisco Del Arco, of the Juarez garrison, Dudley Steele and Mayor Arturo Florez of Juarez.

The administration building, of Spanish architecture, with its beautiful display of cut flowers was crowded throughout the day and the hangars, designed to house three F-10 trimotor Fokkers, with up to

(Continued on next page)



Students of the Boeing School of Aeronautics at Oakland Municipal Airport grouped in front of the school's new building



The U. S. Govt. has Awarded its HIGHEST RATING to the T. C. Ryan Flying School



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In pursuance of this policy a fleet of fifteen licensed airplanes, of six different types, large and small, including five 5-place cabin planes equipped with Wright Whirlwind J-5 motors, are maintained at the school.

Due credit should also be given to the intensive, thoro RYAN System of Training and the unusual advantages for aviation training at Ryan Airport, the Government's official airport of entry between the United States and Mexico.

Ryan students enjoy quicker progress under San Diego's year 'round blue skies . . . . Where balmy ocean breezes blow—winter never comes—and every day is a flying day! Two great Army and Navy aviation training stations and other major aeronautical activities nearby add immeasurably to the pleasure and value of training in this, the world's greatest year 'round aviation center.

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Aeronautical organizations everywhere are calling for men who have had the exacting type of training offered by the T. C. Ryan Flying School. The demand is greater than can be supplied. If you are really in earnest about your future in the aviation industry, we recommend that you select one of the RYAN courses and start training during the coming winter months. This training will qualify you for all U. S. Government licenses and even place you ahead of old-time flyers who have not had the advantage of such complete or thoro training. *It means something* to be a Ryan Graduate!



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The T. C. Ryan Flying School, holding the highest U. S. Government approval for Transport, Commercial and Private Pilot courses, invites the attention of those who are interested in superior standards of aeronautical training. RYAN training costs more than less thoro courses . . . it is worth it! All training is done under the direct supervision of T. Claude Ryan, and courses include:

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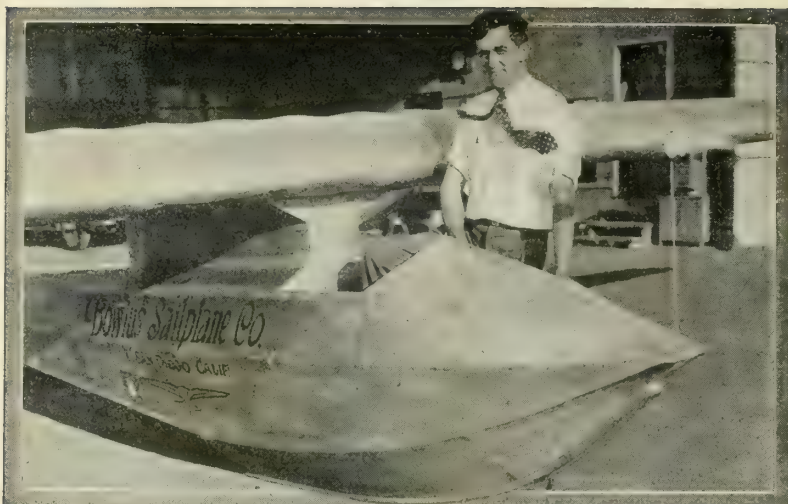
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Write to the T. C. Ryan Flying School, Department E, Ryan Airport, San Diego, California, for illustrative catalog.

Name ..... Address ..... Age .....





W. H. Bowlus, who is reported to have recently made a glider flight of one hour twenty-one minutes in the motorless plane shown here

(Contacts continued)

date shops, drew their quota of visitors. The El Paso band entertained throughout the afternoon.

THE Western College of Aeronautics, in combination with the California Aerial Transport Flying School, has been awarded an Approved School Certificate by the United States Department of Commerce, as transport, limited commercial and private ground and flying school. Mr. Clark of the Western College informs me that they have a class of fifty-two ground students, with applications coming in daily. Business has steadily improved since moving to the Los Angeles Municipal Airport, the instructors averaging over six hours daily in the air. Mr. Talbot, of the California Aerial Transport, has taken over the distribution of the Fairchild planes for the West Coast.

ACCORDING to the official returns of the reading of the sealed barograph used by Jack Frye and Paul Richter in their recent flight when they endeavored to break the American pay-load altitude record in an F-10 trimotor Fokker, they reached an altitude of 19,563 feet. This was not high enough to top the mark made by Waldo Waterman, manager of the Los Angeles

Metropolitan Airport, who reached an altitude of 20,820 feet in a Bach trimotor transport. There was a difference of 1,257 feet in favor of Mr. Waterman's flight. It is a pleasure to know that the competition was made between two such combinations, as both have aviation at heart; and although rivalry between them in this phase is intense, it is also most friendly.

THE first attempt to establish a refueling endurance record by two women pilots will take place at the Los Angeles Metropolitan Airport the first of November when Bobbie Trout and Eleanor Smith go aloft in the Sunbeam plane of the Commercial Aircraft Company. The flyers will be in constant communication with the ground by use of a sending and receiving set of short wave length. Once a day they will broadcast by remote control over a national radio hook-up.

LIEUT. WALTER A. BURGESS, for several years commandant of the U. S. Reserve Corps at Clover Field, and at present Federal aviation expert stationed at Urbana, Ill., is president of the Burgess Aeronautical and Engineering Corporation of Los Angeles, a concern recently capitalized for \$3,000,000 for the production of

aviation motors and accessories. The company has taken a lease of a factory building with 4,500 square feet of floor space. The motor and several of the accessories to be produced are the result of experiments carried out by Lieut. Burgess and his associates over a period of years. I feel sure that Lieutenant Burgess has the good wishes of everyone connected with the industry here on the West Coast, where he has many friends who will be interested in his success.

THE Professional Pilots Association held their regular monthly meeting at their new club rooms at the Teris Hotel on West 6th Street, Los Angeles, on October 8th. Between 75 and 80 members attended the dedication and meeting, which took place after a banquet. The club room is now the executive office of the National organization.

A BEACON has been mounted on the top of the Sunset Fields Golf Course club house at Los Angeles, the rays of which are visible from all parts of Los Angeles and the surrounding country during the night. This beacon, of new design, enables those who watch its rays to positively identify its location and to distinguish it from any other beacon. A combination of color schemes, changing every 3 1/3 seconds, makes this possible. The beacon is a product of the Aeronautical Products Corporation of Los Angeles. As an airport beacon this light would enable each airport to have a different combination of colors, with a difference in the time of changing colors, which would enable a flier to identify an airport, a guide-post beacon or a hazard. One of these lights is being installed over the main entrance of the Western Aircraft Show.

S. A. E. Meeting at Los Angeles,  
Nov. 12-13

AN aeronautic meeting of the Society of Automotive Engineers is scheduled at the Alexandria Hotel, Los Angeles, November 12 and 13. At the session on November 12, members will discuss aircraft engine design, Diesel engines for aircraft and aircraft engine problems. Transport planes, air transportation development and transport maintenance will occupy the meeting on November 13.

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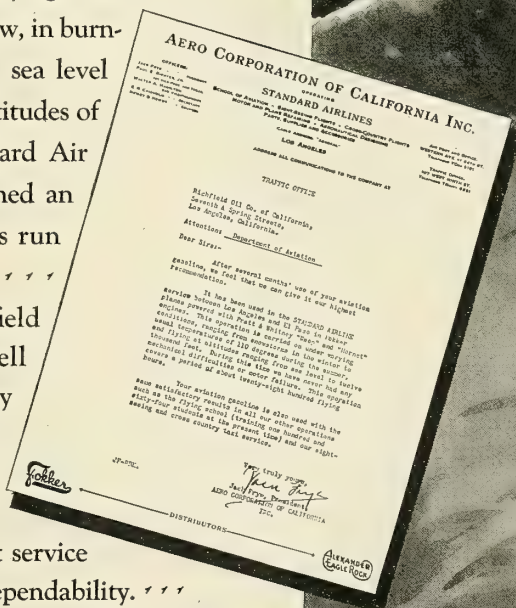


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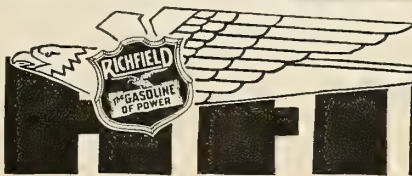
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# RICHFIELD





## CALIFORNIA

**C**ONSTRUCTION of the United Airport at Burbank, Calif., has been completed by Boeing Air Transport. The field is within the city limits of Los Angeles and will be used by Pacific Air Transport as its southern base of operations on the Los Angeles-Seattle air mail, express and passenger route. Two steel hangars have been completed and the field has been leveled off. There are five runways, each 3,500 feet long.

In addition to Pacific Air Transport, the United Airport will be used by other transport lines, airplane manufacturers and air taxi services. The first airplane factory to be built on United Airport is that of the Northrop Aviation Corporation, a subsidiary of United Aircraft and Transport Corporation.

**T**HE Aero Corporation of California has been appointed distributor for the Davis Aircraft Company of Richmond, Indiana, manufacturer of the Davis V-3 Sport monoplane. The Fleet Aircraft Company of Buffalo, N. Y., recently appointed the Aero Corporation distributor of Fleet airplanes in the Southern California district. The Aero Corporation of California is also distributor of Fokker and Alexander airplanes and Pratt and Whitney engine parts.

**P**LANES operated by Western Air Express have traveled approximately 3,100,000 miles without a fatal accident to a pilot

or passengers, and no forced landing has been made on account of motor trouble, according to a recent announcement made by the company. It was stated that during the twelve months ending December, 1929, Western Air Express will have carried an estimated 20,000 passengers, an increase of 300 per cent over the company's total for the previous year when 6,794 passengers were transported.

A flood and boundary lighting system has been installed by Western Air Express on its Los Angeles airport at an expenditure of \$11,000. An arc light of 50,000,000 candlepower throws a beam two and one-half miles. The boundary lighting is composed of twenty-four lights, sixteen of which are white and the remainder are green. Supplementing the border lighting are eleven green lights marking high tension wires adjacent to the field.

Homer J. Merchant has been appointed general traffic manager of West Coast Air Transport. Mr. Merchant was formerly district passenger agent for Western Air Transport at Salt Lake City.

**T**HE Airtech School of Aviation located at Lindbergh Field, San Diego, Cal., recently held an air circus in which the participants were regularly enrolled students of the Airtech flying school. The air circus was held at the Airtech field situated on the old Camp Kearney parade ground, and thirty-five Airtech student pilots participated in the events before a crowd of several thousand.

The events included straight landings from an altitude of 500 feet, spot landings from 200 feet, spins, and a balloon bursting contest. Airtech School of Aviation was one of the first five flying schools in the United States to be given an Approved School Certificate by the Department of Commerce.

**G.** E. Moreland, president of Moreland Aircraft, Inc., has announced the appointment of Fred W. Herman as vice-president, in charge of engineering, and general manager of the Moreland company. The company has also secured the services of J. L. Atwood, formerly an aeronautical engineer at Wright Field, Dayton, Ohio, where he was employed in airplane design and stress analysis.

**T**HE Apache Motor Corporation of Los Angeles, Calif., recently completed a successful test run of its Apache Devil 300-horsepower engine, reported to be the first engine manufactured using magnesium alloy castings in its construction. Bohnalite X, a magnesium alloy used in the structure of the Devil engine, weighs 36 per cent less than aluminum, and is produced by the Bohn Aluminum and Brass Corporation of Detroit.

**T**HE Hamilton Aero Manufacturing Company, builders of Hamilton airplane propellers, is occupying a new western factory constructed on the United Airport, at Burbank, Calif. The terminal was constructed for the United Aircraft and Transport

(Continued on next page)

# SWALLOW TRAINING PLANE



The Pacific School of Aviation, instructors of Hoot Gibson, Harry Hartz, Ruth Elder, Bebe Daniels, Buster Collier, and many other famous people, use the Swallow Training Plane exclusively for instruction. These students admit that, in selecting a school of aviation, they were greatly influenced by the equipment used. Schools interested in increasing their enrollment should give the adoption of this type of equipment serious consideration.

Demonstration by arrangement. Also complete operating data, costs, and all information gladly furnished.

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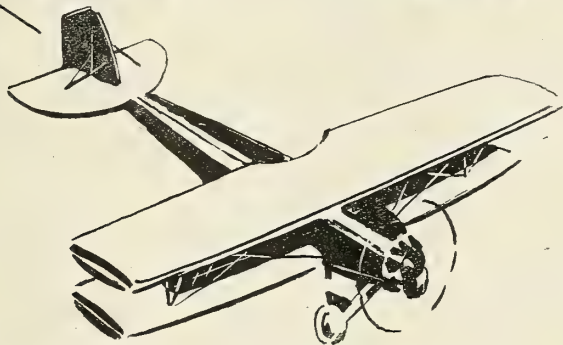
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No hardships of snow, blizzards or bad weather to keep you "grounded." Flying schedules at the Aero Corporation of California are kept each day throughout the winter months.

No investment in expensive winter flying clothes and equipment needed . . . our students fly all winter long in light weight summer togs.

### ADVANCED TRANSPORT COURSE

Aero Corporation of California, pilot contractors to Fokker Aircraft Corporation, Mid-Continent Air Express, Standard Airlines, West Coast Air Transport, and Western Air Express, also offers a special course for transport pilots which carries guaranteed placement for every graduate. Write for details.

Aero Corporation of California Flying School was one of the first five in the United States to be approved and rated by the U.S. Department of Commerce.\* It is the oldest flying school in Los Angeles and has taught and graduated over 1500 flyers.

Learn to fly under government licensed instructors in the latest model planes . . . Kinner, Wright, and Pratt & Whitney engines.

Write immediately for details concerning California's leading flying school.

**Airport: 9403 South Western Avenue  
Los Angeles, California**

\*Rated and approved by U. S. Department of Commerce, July 15, 1929, for Private Pilot and Limited Commercial Licenses.

# AERO CORPORATION OF CALIFORNIA



(California News continued)

Corporation of which the Hamilton Propeller Company is a subsidiary. The Hamilton factory at Milwaukee was recently enlarged to take care of increased business. The plant at the United Airport at Burbank will be used for manufacturing, testing and experimentation in metal propeller designs and to service propellers requiring factory handling in the west.

**T**WELVE divisions of the Bendix Aviation Corporation will open headquarters for the territory west of the Mississippi River in the new Bendix Aviation Building at Los Angeles when construction work is completed.

These divisions are: Bendix Brake Co., Bendix Service Corporation, Bendix-Cowdrey Brake Tester, Inc., Eclipse Machine Co., Delco Aviation Corporation, Eclipse Aviation Company, Eclipse Textile Devices, Inc., International Gernandt Motors, Ltd., Scintilla Magneto Co., Stromberg Motor Devices Co., Stromberg Research Corporation, and Pioneer Instrument Co.

**T**HE Gruss Air Spring Company of America, Ltd., of San Francisco, has moved to new quarters at 4536 District Boulevard, Los Angeles. The Gruss Air Spring Company has been a builder of Oleopneumatic, automotive and aircraft shock absorbers since 1911. Upon moving into the new location, production facilities were concentrated upon the new B Series Gruss Air Struts. The officers of the Gruss Air Spring Company of America, Ltd., are as

follows: Marion Newman, president and general manager; R. S. Waugh, manager, aeronautical division; W. King Jenkins, chief engineer, and Whiteman Reed, production manager.

**T**HE Ocker System of Blind Flying has been incorporated in the regular student curriculum of the Airtech School of Aviation, Lindbergh Field, San Diego, Calif. Captain William Ocker, originator of the system, completed negotiations with the Airtech School recently while en route to Brooks Field, Texas, where he was sent by the Army to instruct pilots in the Ocker System. The Ocker method of instruction includes blind flying in a covered cockpit, a safety pilot accompanying in a front seat.

**T**HE San Diego Air Service Corporation located on Lindbergh Field, San Diego, has been appointed distributor in Riverdale County, California, for the Travel-Air Company of Wichita, Kan. The company is also Travel-Air distributor in San Diego and Imperial Counties. The San Diego Air Service Corporation is the holding company of the Airtech School of Aviation.

**T**HE fall enrollment in six classes in aviation conducted by the University of California totals 175 students. Additional courses are to be organized during the winter quarter. The fall classes are comprised mostly of business and professional men studying aviation to meet problems in their dealings with the aeronautical industry.

## OAKLAND

[HOWARD V. WALDORF]

**H**HEADQUARTERS of the Varney Air Service, a recently formed \$500,000 subsidiary of the Varney Air Lines, has been established at Oakland Municipal Airport. The company is headed by Walter T. Varney; other officers include Louis Muller, vice president and Lieut. Franklin Rose, general manager.

The company purchased the holdings of the Metro Air Service and is to specialize in aircraft sales and service. A flying school is to be conducted for prospective purchasers of planes. Agencies held by the company include the Stearman and Hamilton for northern California, Washington, Oregon, Idaho, Montana, Hawaii, and the Orient.

**N**EW officers recently elected for the Oakland Flying club at Oakland Municipal Airport include Jack Worthington, president, George Fensky, vice president, and E. J. Forbes, treasurer.

**T**HE San Francisco Bay Base of the West Coast Air Transport Corporation, operating a passenger and express service to the Pacific Northwest, was transferred from Mills Field to Oakland Municipal Airport on September 29. The company is owned by executives of the Western Air Express, and the change was made to effect a closer connection with planes of that service. E. A. Russell, recently appointed field manager for the Western Air Express, is in charge

## AIRCRAFT INSURANCE

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Theft  
Cargo  
Windstorm  
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Accidental Damage  
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GET INTO THE COMING GAME

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Aluminum, Aluminum Alloys,  
Cloth, Dope, Thinner, Paint, Wire,  
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Everything for the airplane, mechanic, pilot, or manufacturer.

**CRAWFORD AIRPLANE SUPPLY CO.**

VENICE,  
CALIF.

of the operations of both companies at the Oakland airport base. The West Coast organization operates trimotor Fokkers. The move gives Oakland Municipal Airport five air transport services, one going east, two south, and two north.

**A**IRCRAFT Industries has received an Approved Type Certificate for its three-place cabin monoplane powered with a Comet engine. The plane is to be placed in quantity production in a factory being constructed at Modesto, California. The first planes were built at the Oakland plant which has now been changed to a repair shop.

**P**ORTER BUSH of the Pacific Air Transport staff at Oakland Municipal Airport has been appointed field manager for the Boeing System in southern California.

## SACRAMENTO

[S. L. KYLE]

**J**ACK BEILBY has joined the Travel Air airplane force as sales representative for Northern California. Mr. Beilby's territory will extend north from Sacramento to the Oregon line. His headquarters will be at the Del Paso airport.

**R**ESUMPTION of service on an airline connecting Sacramento, Visalia, Fresno and other interior California points by the West American Aviation Corporation, Ltd., is anticipated. The West American firm has acquired the Western Coast Airways, which formerly operated that service.

Theodore F. Brix, former head of the Western Coast Airways, has been made Fresno manager of the new concern. By

acquiring the Western Coast Airways, the larger organization has gained control of five established aviation units in Central and Northern California. The West American Corporation is now engaged in mergers and purchases which will give it operating units at San Francisco, Palo Alto, San Jose, Sacramento and Visalia.

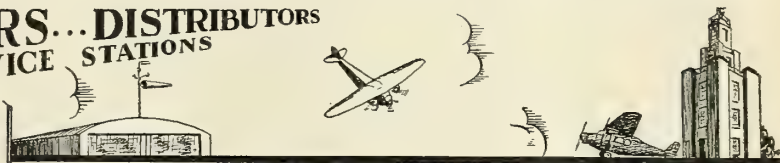
The company will own and operate airports. It also will do taxi work, charter trips, and aerial photography. Its equipment at present consists of twenty planes, some of which are training planes, which will be used in flying schools. It is expected that the corporation will establish an aviation school in connection with each unit. The corporation plans improvements in Fresno aggregating \$75,000.

These improvements will include \$25,000

(Continued on next page)

# MANUFACTURERS... DISTRIBUTORS OPERATORS... SERVICE STATIONS

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Heffron-McCray-St. John, Developers  
Waldo D. Waterman, Gen. Mgr.



(California News continued)

for the lease and improvement of a private airport, and \$50,000 for new equipment.

#### Articles of Incorporation Recently Filed in California

AMONG the articles of incorporation filed in California by aircraft concerns recently were those of the Northrop Aircraft Corporation of Wilmington, Del., incorporated for \$500,000. Its incorporators are S. L. Mackey, J. Skrivan and G. D. Clark, all of Wilmington, Del.

Articles of incorporation also have been filed by the Western Aircraft Distributors, San Francisco. This organization, which is capitalized for \$150,000, is to buy, sell, lease, operate and manufacture aircraft. C. T. Eastman, R. A. Newall and W. H. Ruddell, all of San Francisco, are the incorporators.

The Associated Air Services, Ltd., another organization which has filed its articles, is organized to design, build, manufacture, lease, purchase and otherwise deal in aircraft. The principal office of the organization is in San Francisco, and the directors are Thomas F. Butler, M. L. Gorman, E. P. Kayser, H. W. Klee, A. P. Mantz, S. G. Whittlesey, H. J. Sabalot and N. S. Sonna. An aircraft securities company, the United Aircraft Investment Corporation of Reno, Nev., has filed its articles of incorporation. The incorporators are J. E. Sullivan, E. Armstrong and F. C. Norton. The purpose of the corporation is to deal in aircraft stocks.

### ALAMEDA

[HOWARD V. WALDORF]

TO provide a dustproof surface, layers of a crushed oyster shell composition have been laid at the Alameda Airport and the San Francisco Bay Airdrome at Alameda. Selection of this composition as a surface followed extensive experiments conducted with the object of discovering a material that would resist the salt water present in the soil. This method of surfacing is said to be economical as oyster shells are easily obtained in the area. Layers ranging to nine inches in thickness are used at the two fields.

#### Curtiss School at Oakland Approved

RECEIPT of a federal certificate to conduct flying and ground school courses for private, limited commercial and transport classifications was announced at Alameda Airport October 5 by Capt. W. H. Royle, director of training for the Curtiss Flying Service. Flying instruction is to be given at Oakland Airport. Granting of the certificate followed an inspection of the Curtiss school equipment and examination of the instructors by R. I. Hazen, federal inspector. The school is the first in northern California to receive the federal license. Instructors licensed include Capt. Royle, Roy Hunt, George McCallum, Victor Johnson, William Brown, Charles G. Shone, Fred Havell, Frank Scofield, Joseph Long, Bernie Hayes, George Smith, Harvey Greenlaw,

and Merlin Hannan. Seventeen training planes are assigned to the school.

A SPECIAL week-end airplane service for duck hunters is operated from Alameda Airport by the Maddux Air Lines. Leaving the Alameda Airport Saturday afternoons, trimotor Ford planes transport the hunters to the duck hunting grounds of northern California. Landings are made at Willows and Los Banos, where extensive duck hunting is done. The return flight is made late the following afternoon. The service is to be maintained throughout the duck season which closes January 15, 1930.

### NEW MEXICO

[J. C. MACGREGOR, JR.]

THE Albuquerque, New Mexico, Airport will meet the Department of Commerce "A" rating requirements for lighting with installation of proposed new flood lights. The beacon light at the airport will be increased from 2,000,000 to 8,000,000 beam-candlepower and the flood lights will be increased from 4,000,000 to 8,000,000 candlepower.

A hotel addition to the restaurant at the Albuquerque Airport will be constructed in the near future, according to the announcement by Dayton Dalbey, general manager of the airport. The addition will be two stories in height and will have accommodations for 24 guests.

(Continued on next page)

# SUPPLIES

## AUTHORIZED DISTRIBUTORS

**Wright Whirlwind Parts**  
**Scintilla Aircraft Magnetos**  
**Stromberg Aircraft Carburetors**  
**Elgin Avigo Instruments**  
**Flightex Fabric**  
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**Rusco Shock Cord**  
**Bendix Wheels and Brakes**  
**Russell Lobe Parachutes**

**Consolidated Instruments**  
**Firestone Tires**  
**Willson Goggles**  
**Macwhyte Tie Rods**  
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Realizing that experience is the best teacher, the complete **AIRTECH** System provides diversified training in five distinct types of modern aircraft.

In mastering these open ships and large and small cabin planes, **AIRTECH** students gain the ability to pilot any of the aircraft, predominant in modern air commerce.

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# Airtech School of Aviation

Department of Commerce Approved  
Transport Ground and Flying School

Lindbergh Field

San Diego, California



(New Mexico News continued)

THE Mid-Continent Air Express started operations over the Denver-El Paso line on September 21. The southbound plane follows the Rio Grande Valley from Albuquerque to San Marcial and then swings 20 to 30 miles east of the river into El Paso. The northbound plane flies from Albuquerque to Santa Fe, then through Las Vegas, Pueblo, Colorado Springs and into Denver.

## COLORADO

[ROBERT C. CLEMINSON]

DAILY plane service between Denver and Kansas City is operated by the United States Airways, Inc. Stops are made at Goodland, Hoisington and Salina, Kansas. W. A. Letson is president, and J. H. Corder, vice president, of the operating company. George E. Halsey is the newly appointed superintendent in charge of personnel and equipment and B. J. Palmer is Denver superintendent. Five metal Flamingo planes with Wasp engines are being used with H. H. Montague, Homer E. Sweet, and C. M. Bontrager as pilots. Carle B. Jackson is chief mechanic.

FINISHING touches have been put on the new Denver Municipal Airport and the activities are increasing rapidly. The field is fully lighted and a circle has been placed in the center of the field; at present there are two runways over a mile long. A bill

was recently passed by the council to start condemnation on 72 acres on the southeast corner of the field to provide more landing space. The field is now used by the United States Airways, Western Air Express and Mid-continent Air Express.

The field was dedicated on October 18th, 19th and 20th. William F. Wunderlich is field manager.

A GROUP of business men at Fort Morgan, Colorado, has formed the Morgan Airways, a flying club, to obtain a landing field near the city and purchase a plane. The men at the head of the organization are Milton Van Bradt, Arthur Peters, Willys Warner, L. B. Rothrock and D. J. Van Bradt.

### Winners of Eaglerock Awards

WINNERS of the Eaglerock Awards for 1929 have been announced by the Alexander Aircraft Company of Colorado Springs, Colo. Percy de F. Warner, a law student of New York University and student aviator in the Naval Air Reserve, was awarded the new Eaglerock biplane for four articles on the operation of a flying club. Paul C. Spiess, a student of engineering at the University of Colorado, won the \$1,000 four-year scholarship to the Guggenheim School at New York University for original plans for a new altimeter. In addition to the two national awards, seventeen free flying courses were given to territorial winners by Eaglerock distributors.

## IDAHO

[GLEN PERRINS]

A. C. BLOMGREN, state aeronautical engineer, has approved airports in Idaho on routes that link with Salt Lake City, Utah. Pocatello has properly marked the direction to its airport and the field has been better lighted and improved. An airport for Preston, Idaho, has been approved, as has one at Soda Springs. Lewiston, Idaho, a town which at present has no facilities for airplanes, is circulating a petition among its taxpayers asking for a vote on an airport.

REGULAR flying service between Salt Lake City and Ely, Nevada, has been inaugurated by the Seagull Air Lines, Inc., with flights scheduled Mondays, Wednesdays and Saturdays. The company has applied for a mail carrying contract.

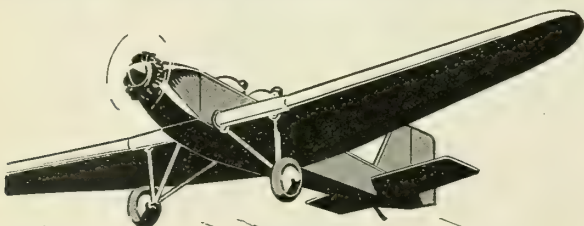
[IDA M. DURNIN]

AIRPORT bonds for Burley, Idaho, were carried in the recent city election. This approval authorizes the purchase of a 235-acre field now being used as an airport. Border lights are already on the ground and will be installed at once.

Plans for forming an Aero club at Burley and the purchase of a small commercial and passenger airplane are now under way. It is proposed to buy a 165-horsepower two-passenger plane, and to employ a regular pilot. The club is to erect a hangar and operate a flying school.

(Continued on next page)

## AEROMARINE-KLEMM



### ANNOUNCING

the appointment of the Angelus Aero Corporation as Southern California Distributors for the

AEROMARINE-KLEMM

Complete Factory Service Facilities

ANGELUS AERO CORPORATION

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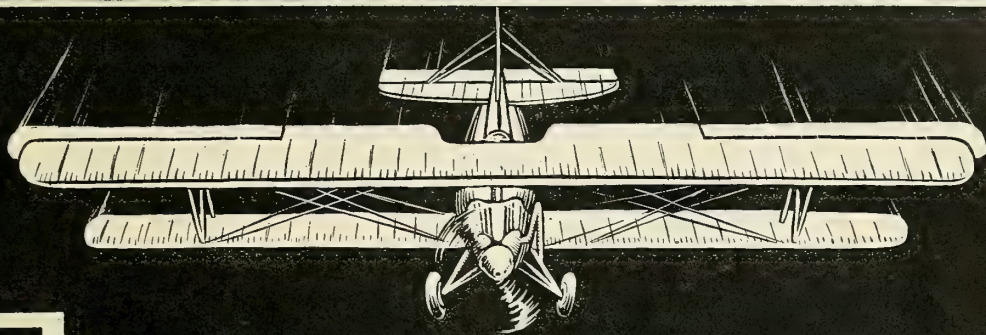
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**A**SSURE yourself of a profitable future in this new, great game of Aviation by securing the right training.

No expense has been spared here at Garland Airport to make The Garland School of Aeronautics the most complete and modern training school in the entire country.

The airport itself owned and controlled by the founder of the school is already looked upon by the entire nation as a model in-so-far as equipment and natural facilities are concerned. An all-direction flying field free from hazardous obstructions equipped with flood lights, boundary lights and beacon gives it a Class A Rating.

Modern machine shops, wing and wood works, large hangars, a modern restaurant, an office building, airy class rooms and an up-to-date dormitory right on the field allows all students to receive the maximum benefit from their time spent here.

All airplanes used are the latest model air-cooled radial types. All are government approved and licensed. All instructors are licensed by the Department of Commerce and are experts in their lines.

Every branch of Aeronautics is taught thoroughly. If you wish to become a pilot, mechanic, airplane salesman, airport manager or any one of the many trained experts demanded today you can make no mistake by investigating this school at once.



Corner of Garland Airport Showing One of the School Hangars in Center With Administration Building and Dormitory on Right

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GENTLEMEN:

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Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_



(Idaho News continued)

**C**ONSTRUCTION of the Boise radio range and radio beacon station for air mail flyers will be completed this fall, it was announced recently following the visit of J. E. Erickson, representing the Bureau of Lighthouses of the Department of Commerce. Mr. Erickson was in Boise conferring with A. C. Blomgren, state airway engineer, and G. E. Tucker, engineer of the state land department, who has done the engineering work for the government on selection and survey of the site.

## NORTHWEST

[F. K. HASKELL]

**T**WELVE-HOUR daily passenger and express service over the northern air route between Spokane and St. Paul will be started early next spring by the International Air Transport, it was announced recently by Newton Wakefield, general manager. The International Air Transport is the parent organization of the Mamer Flying Service and the Mamer Air Transport. Mr. Wakefield will survey the route for engineering purposes and Lieutenant N. B. (Nick) Mamer will make an organization flight over the route. The route of the new line will follow the general route of the Northern Pacific Railroad. Trimotored planes are to be used between Spokane and Livingston, Mont., and six-place single-motored ships over the remainder of the route. The cities

along the proposed route include Missoula, Butte, Livingston, Billings and Glendive, Mont., and Bismarck and Fargo, N. D.

**W**ORK will be started immediately upon a landing place at Tacoma, Washington, for seaplanes of the Alaska-Washington Airways, Inc., which is planning a triangular service from Tacoma to Seattle and Olympia. The landing is to be located just north of the Foss Launch and Tug Company headquarters near the commercial dock. No definite schedule has been released by the Airways company. A fleet of seven seaplanes will be used in the service.

**T**HE Inter-City Airlines of Spokane, Wash., operating airplane passenger service between Wenatchee, Ellensburg and Yakima, have been absorbed by the Alaska-Washington Airways, it was announced recently by J. L. Carman, Jr., president. Two trips a day will be made between the two cities by the new operators. The Alaska-Washington Airways operates passenger lines between Seattle and Victoria, Tacoma and Alaskan points.

**P**LANs for a double row of beacons between Portland and The Dalles have been indorsed by F. C. Hingsburg, chief engineer of the Department of Commerce Airways Division. The plan was suggested by S. S. Boggs, airways extension superintendent when he found that a single line of

beacons through the Columbia gorge would not be satisfactory.

Eight or ten 2,000,000-candlepower beacons will be set on islands in the river. Smaller beacons will line each river bank. Mr. Boggs expects to complete the Portland-Pasco survey within six weeks, and bids for construction of the beacons will be called at once.

**A** NEW entrance to the Swan Island airport at Portland, Ore., to cost \$222,000 will be constructed immediately, it was jointly agreed by the City of Portland, Multnomah county and the O. W. R. & N. Railway which will furnish the money for the project pro rata. It will be a high-arched overhead crossing over the O. W. R. & N. tracks.

**F**ORMATION of First National Flying System, Inc., at Portland, Ore., to act as holding company for the Rankin System, Inc., Aircraft Builders Corporation, Adcox Schools and exclusive rights to the manufacture and distribution of the Davis control stick has been consummated.

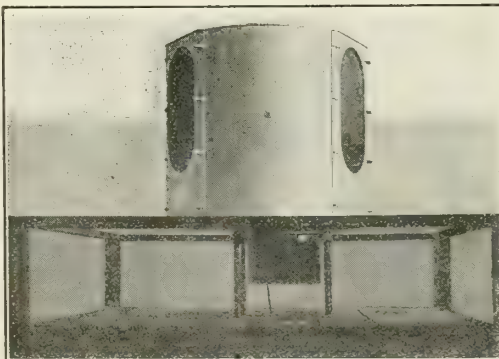
James A. Malarkey has been named as president of the new company; George A. Braley, vice president; C. R. Peck, secretary and director; and J. E. Allen, treasurer. Among the directors are G. G. Gerber, J. Kegerreis, Alexander Klemm, Charles J. McPherson, John W. Parker and E. J. Swindells.

(Continued on next page)

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**COLOR** over 40 combinations—identifying Landing Fields, Guides and Hazards.

**FLASH INTERVAL** 18 flashes per minute. White every 10 seconds followed by two colors.

**FLASH LENGTH** Produces glow easy to pick up while flying.

**VERTICAL SPREAD** Visible on level or at great heights.

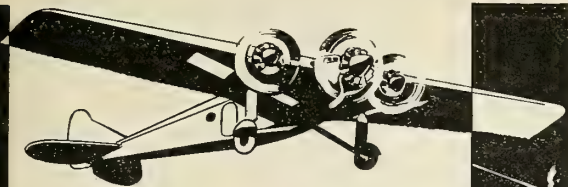
**CEILING LIGHT** Fixed ceiling from 30 in. Intensifier acts as guide.

**CANDLE POWER** Approximately 10,000,000 candle power.

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but it's "half the battle" when it comes to locating airplane distributing headquarters. More airplanes have been sold at Los Angeles Metropolitan Airport during the past four months than at any other airport in the Southwest. Establish representation with us and watch your sales grow.

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LOS ANGELES, CALIFORNIA



(Northwest News Continued)

**D**R. EDMUND H. PADDEN of Portland, Oregon, has been appointed flight surgeon for the Boeing System of airlines with offices at the Oakland Municipal Airport. In addition to checking the physical condition of Boeing pilots periodically, Dr. Padden will examine prospective students for the Boeing School of Aeronautics which is located at Oakland.

## WASHINGTON

[C. M. LITTELJOHN]

**C**ALVIN CANTRILL, 31 years of age, 5 feet 11 inches, weighing 145 pounds, recently disappeared from his home in Seattle and the Boeing airplane plant, where he was a photographer for the company.

**A**N expansion program of the air service between Seattle, and Bremerton, Wash., across the Sound, has been announced by Vern Gorst of the Gorst Air Transport Company, operator of this air ferry. Ten thousand tickets for passengers on this service have been sold since its establishment, warranting an increase in the size of the ships and the schedule, according to Mr. Gorst. The additions to the service will be made next spring.

**T**HE record of accomplishment for September at Boeing Field, Seattle, shows the busiest month in the field's history. There were 561 sightseeing flights; 1,112

passengers carried; 1,352 student flights; with 335 flying hours of planes regularly housed at the field.

**A**N automobile-airplane highway through the Pacific Northwest, British Columbia, and up into Alaska, is now projected with the support of the Alaskans. Premier S. F. Tolmie, of British Columbia, recently spoke of the new project in Seattle and advocated the auto-air connection with the northland. Judge James Wickersham of Juneau has also spoken of the benefits to be derived from such a line.

**I**N order to improve Boeing Field at Seattle an appropriation of \$100,000 was made available recently to carry on the work of filling in the old portion of the field with pumpage from the Duwamish waterway. Increased take-off and landing space, as well as area for parked airplanes, is being made available with the constant improvement of the field.

**T**RAVELING ninety-five miles an hour, an airplane piloted by R. C. Graham, recently seeded 160 acres of land on Lummi Island, near Bellingham, Washington, in an hour and forty minutes. Graham was assisted by W. A. Granger, owner of the land, who poured the seed from a sack in a six-inch stream through a door in the cockpit, using 800 pounds of seed. The plane flew about 500 feet above ground. The quarter section was seeded with alfalfa, timothy, clover and orchard grass.

**A**LASKA-WASHINGTON AIRWAYS, Incorporated, Seattle, Washington, has taken the Fairchild dealer franchise for King County, state of Washington, and territory of Alaska. The following are officers of the company: H. F. Alexander, Joshua Green, Joseph Carman, Alex Holden and Don. B. Bennett.

Alaska-Washington Airways, Incorporated, recently inaugurated a seaplane air line from Seattle, Washington, to the interior of Alaska.

**P**. G. JOHNSON, president of Boeing Companies, Seattle, has announced the appointment of W. L. Campbell as manager of Boeing Transport at Burbank, Cal. William P. Hoare, formerly superintendent of eastern division, has been appointed field manager at Cheyenne, Wyoming.

**P**ACIFIC AIR TRANSPORT, pioneer airline operating up and down the Pacific coast on the Seattle-Los Angeles route, recently completed its third year of operation. Two and one-half million miles have been flown by the company during the three-year period. The entire P.A.T. fleet has been repowered with Hornet engines in a general speeding up of schedule and increase in loads carried. Pacific Air Transport is a division of the Boeing System and uses Boeing four-passenger mail planes. The officers of the company are as follows: P. G. Johnson, president; A. K. Humphries, vice president, and C. Eugene Johnson, operations manager.

## The NEW STEARMAN Better Than Ever

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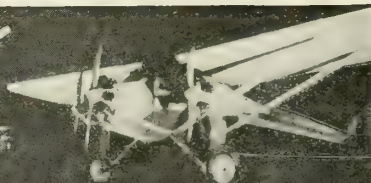
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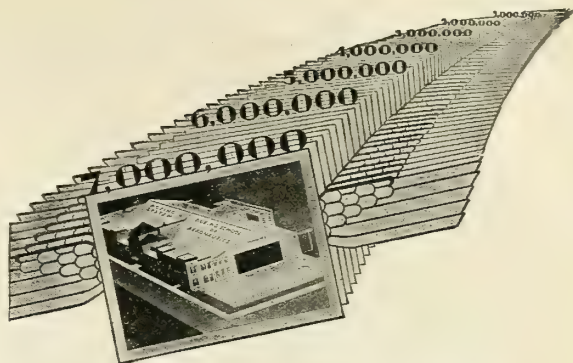
Nicholas-Beazley  
Airplane Co., Inc.,  
Marshall, Mo.

Universal Aviation Corp.,  
(Robertson Aircraft Corp.,  
Division),  
Anglum, Mo.

Air Transport Equipment,  
Inc.,  
Hangar 20-A, Curtiss Field,  
Garden City, N. Y.

Johnson Airplane & Supply  
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Cleveland, Ohio.



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—are behind this  
flying school!

### Do You Know:

- that Boeing-built planes carry 50% of the U. S. air mail?
- that a third of the United States air mail poundage is carried by Boeing pilots flying Boeing planes on Boeing operated air routes?

Experience like this is the background upon which the Boeing System of Aeronautical Training is built. Facts *flown out* of 7,000,000 miles of night and day flying form the basis of courses never before offered—taught by men who are admittedly leaders in their particular fields of aeronautics.

New classes are now being formed monthly for winter instruction at Oakland Airport where the mild climate makes midwinter flying as commonplace as in summer.

Advanced training makes a competent pilot. Don't just "pick up" flying. Choose your school with an eye to your future. Ask yourself *which school's diploma will be the best endorsement when you seek a connection after graduation*. Check both ground school and flying courses. By this test, the Boeing School of Aeronautics course, is a sound investment.

**New class forming November 23rd, 1929. Plan now to enroll! Mail coupon below, or write us in detail about your plans for an aeronautical career.**

## BOEING SCHOOL of AERONAUTICS

Division of United Aircraft and Transport Corporation  
**Airport · Oakland · California**

I am interested in the Boeing School of Aeronautics' course I have checked:

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| <input type="checkbox"/> Private Pilot<br>35 hrs. ground school. In air, 10 hrs. dual, 8 hrs. solo.       | <input type="checkbox"/> Master Mechanic<br>Training for operations and manufacturing, 22 subjects. 1008 hrs. (lecture-shop).              | <input type="checkbox"/> Special Master Pilot<br>Big plane flying. Open to Transport License holders. |
| <input type="checkbox"/> Transport Pilot<br>140 hrs. ground school. In air, 50 hrs. dual, 150 hrs. solo.  | <input type="checkbox"/> Master Pilot Ground School<br>Includes subjects given only in universities. 864 hrs. (lecture-shop). 22 subjects. | <input type="checkbox"/> Airplane and Engine Mechanic<br>140 hrs. in lecture, laboratory and shop.    |
| <input type="checkbox"/> Limited Commercial<br>70 hrs. ground school. In air, 25 hrs. dual, 25 hrs. solo. |  |   |

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The new Scully communicating helmet makes air-conversation easy and natural. A patented glove fitting Scully air-mail helmet, fitted with patent amplifiers under soft, comfortable ear pads, and leading from pilot to passenger or student a strong, light flexible tubing—of rubber and fabric—makes this new communicating helmet easy and comfortable to use for instructional or conversational purposes. The ordinary voice is easily heard above the roar of the motor.

Windtite, non-flapping, tailored to fit like all Scully airmail helmets and in addition has new features of particular benefit for air-communication work. The Helmet may be used without tubes if desired. Every pilot or student pilot should own a set. Increases flying joy, improves flying—indispensable for proper instruction. Made in all sizes. Price complete for single set, helmet with ear phones and communication tubes only \$17.50. Double set may be had when desired. Wholesale prices to legitimate flying fields, schools and dealers.

Mail orders filled if you give head size or complete literature sent upon request.

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Your "Wasps" and "Hornets" will receive this same factory-perfect service from the agents for Pratt & Whitney parts, sales and service in California, Arizona, New Mexico and West Texas.

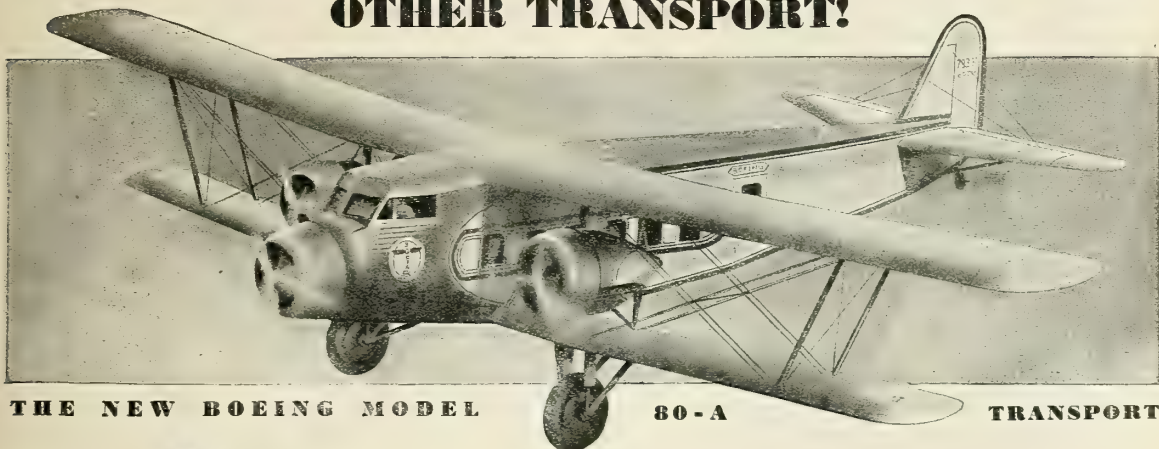
Drop in on a friendly field and meet a crew of genial experts.

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## AERO CORPORATION OF CALIFORNIA

# COMPARE THIS PERFORMANCE\*

## WITH THAT OF ANY OTHER TRANSPORT!



**T**HIS eighteen passenger, Tri-motor Transport incorporates features developed by seven million miles flown by Boeing System in Boeing planes. Tests with full load have proved its superiority in performance under varied conditions of altitude and temperature. It is *swift, easily maneuverable, economical* to operate and *comfortable* to ride in.

In offering it commercially to the domestic and foreign market it is the belief of America's largest airplane manufacturer that Model 80-A is the best Transport of its type built.

Complete information will be sent upon request.

## BOEING AIRPLANE COMPANY

*Division of United Aircraft & Transport Corporation*  
**SEATTLE, WASHINGTON**

### \*PERFORMANCE

(Boeing Model 80-A with full load)

**Speed:** High speed 138 m. p. h.; cruising speed 115 m. p. h. Ample reserve power. Cruises 4½ hrs. without refueling.

**Quick Take-off; Slow Landing:** Takes off in 11 seconds after 750 ft. run (only 1800 ft. run required from field 6200 ft. above sea level). Lands at 55 m. p. h.

**Power Plant:** Only transport on the market with 3 Pratt & Whitney 525 H.P. "Hornet" engines. N.A.C.A. cowling.

**Useful Load:** 18 pass., 2 pilots, 1 steward and baggage (7083 lbs.); or 12 passengers and mail.

**Radio Equipped:** Bonded, shielded and wired throughout.

**Fabric Covering:** Permits speedy, economical, accurate inspection—a safety factor.

**Completely Equipped:** No extras to buy, no weight to add.

**Comfort Features:** Noise-proofed and insulated cabin, 6½ ft. high, 5½ ft. wide, 19 ft. long. Upholstered, reclining adjustable chairs. Heating and ventilating system. Hot and cold running water. Lavatory large enough to permit shaving. Individual reading lamps. Racks for hats and parcels. A custom-built job with many new refinements and conveniences.



# Here we teach *not*



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**THE FAMOUS 'ROBIN' CABIN PLANE,** sister ship of the world's endurance record holder, is standard training equipment, together with the Fledgling, at the 40 Curtiss-Wright Flying Schools throughout the country.

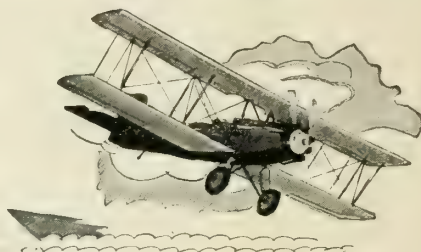


**THESE FUTURE PILOTS** learn to service their own machines. This practical work gives students a thorough working knowledge of all types of engines and ships.



**DAILY CLASS-ROOM WORK** and flying instruction go hand in hand. Students learn the theory and practice of flying at the same time.

The Curtiss-Wright Flying Schools make learning to fly just a *part* of their complete training



**I**T used to be "Young man, go West." Now—it's "Young man, go into *Aviation!*" Because aviation offers such far-reaching opportunities to ambitious young men of today. It's *the* transportation of the future—*speed* transportation.

Become a pilot? That's *one* step in learning aviation. To become, not just a pilot who can push and pull on the controls, but a pilot who "knows his stuff"—who has the foundation which enables a man to keep up.

But have you ever stopped to consider that for every man in the air, there are three men on the ground? Men who are just as necessary to aviation as the pilot is?

## ANNOUNCEMENT

Curtiss Flying Service is now a part of Curtiss-Wright Corporation, the recently announced amalgamation of Curtiss and Wright interests. Henceforth, Curtiss Flying Service will operate under the name of Curtiss-Wright Flying Service; a Division of Curtiss-Wright Corporation.

And think of the wide scope of aviation. National and international air mail and passenger transport . . . country-wide charter flying . . . forest patrol . . . crop dusting . . . aerial survey work . . . advertising . . . pleasure and sport flying. And every airport in the country—there are over a thousand today—has an operations department where the management of the field centers.

In addition to pilots, aviation demands the services of thousands of trained men to carry on this great work. And it will need *increasing* thousands as aviation comes into its own as *the* modern method of transportation.

You probably already know what Curtiss-Wright flying schools—40 of them, all over the country!—can offer the man who wants to become a *good* pilot.

The very best instructors . . . association with the men who are conducting a nation-wide business-of-the-air . . . the finest opportunities for getting the job you want, once you have Curtiss-Wright training.

# CURTISS-WRIGHT

# only Flying.... but AVIATION!



But the Curtiss-Wright aviation courses are so much *more* than the finest school in the world for *pilots*. Through Curtiss-Wright flying schools you can learn *any* branch of aviation you want to learn!

If you want to break into aviation—without making any mistakes—fill out the coupon on this page—and send it in, *today*.

Curtiss-Wright Flying Service, Dept. K,  
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| Buffalo, New York       | Montclair, New Jersey     |
| Chicago, Illinois       | Nashville, Tennessee      |
| Cleveland, Ohio         | Oklahoma City, Oklahoma   |
| Columbus, Ohio          | Pittsburgh, Pennsylvania  |
| Dallas, Texas           | Portland, Maine           |
| Denver, Colorado        | Providence, Rhode Island  |
| Detroit, Michigan       | Raleigh, North Carolina   |
| Hartford, Connecticut   | Rockland, Maine           |
| Houston, Texas          | St. Louis, Missouri       |
| Indianapolis, Indiana   | San Francisco, California |
| Kansas City, Kansas     | Springfield, Mass.        |
| Los Angeles, Calif.     | Syracuse, New York        |
| Louisville, Kentucky    | Toledo, Ohio              |
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| Martha Vineyard, Mass.  | Worcester, Mass.          |

## FLYING SERVICE

*The World's Oldest Flying Organization*



# AERONAUTICAL INDUSTRY

## LIEUT. DOOLITTLE'S BLIND FLIGHT

**L**IEUT. JAMES H. DOOLITTLE made a successful solo blind flight at Mitchell Field, Long Island, on September 24, which consummated the past year's efforts of the full-flight laboratory of the Daniel Guggenheim Fund for the Promotion of Aeronautics. On his flight Lieut. Doolittle took off, flew away from the field, turned and recrossed it, turned again and came in for a landing a short distance from his starting point, flying entirely by instruments. The flight marked a solution of the fog-flying problem, for the study of which the full-flight laboratory was organized over a year ago.

The principal factors in making possible the accomplishment were a new application of the visual radio beacon, the development of an improved instrument for indicating the longitudinal and lateral attitude of an airplane, a new directional gyroscope and a sensitive barometric altimeter accurate enough to measure the altitude of the airplane within a few feet of the ground. The test plane used in the experiment was equipped with a completely covered cockpit. Lieut. Doolittle used an instrument indicating to the pilot the longitudinal and lateral attitude of the airplane with relation to the ground. In addition to the long-distance radio beacon already in use at Mitchell Field, a beacon was installed governing the immediate approach to the field. On the instrument board a visual radio receiver enabled the pilot to determine the location of the landing field.

Lieut. Doolittle has been in charge of the full-flight laboratory from the start, and was made available for this work through the Army Air Corps which loaned his services to the Guggenheim Fund. Professor William Brown of the Department of Aeronautics, Massachusetts Institute of Technology, was his assistant. The Bureau of Standards and the United States Army and Navy both contributed to the work, as well as the Pioneer Instrument Company, Taylor Instrument Company, Sperry Gyroscope Company, Bell Laboratories, Radio Frequency Laboratories, and Kollsman Instrument Company. A Consolidated NY2 and a Vought O2U1 were used by the full-flight laboratory in conducting its researches; the Vought plane was used for the blind-flight demonstration.

Work in the problem of fog-flying was started in 1926 by the Guggenheim Fund by the formation of a committee to consider the question. The full-flight laboratory was consequently formed, and the Fund built up a wide-spread system of research on the subject through individuals, educational institutions and commercial organizations. Research of the Guggenheim Fund divides into six classes: full-flight laboratory and equipment, direction-finding in flight, position-finding near fields and on land, fog penetration, fog removal and collision.

Work in the full-flight laboratory has included study and experimentation on general equipment, the use of radio, instruments, automatic pilots and inherent stability. The problem of direction-finding in flight included consideration of the compass, position indicator, radio beacon and bearings, and the Eaton compass. Landing, acoustic, bomb, and infra-red altimeters, gyroscopic turn indicators, mechanical landing devices, the use of electro-magnetic waves other than radio, electrified cables and sound beacons were the subjects of the research on the problem of position-finding near fields and on land. Several scientists throughout the country are conducting experiments under the direction of the Fund on fog penetration. Fog removal has been the purpose of experiments by electrical, mechanical and hydroscopic methods, and ice prevention has been studied.

## LINDBERGH COMPLETES SO. AMERICAN TRIP

**C**OL. CHARLES LINDBERGH has completed an aerial exploration of Southern Mexico and Central America sponsored by the Pan American Airways and the Carnegie Institute. The purpose of the expedition was to map out the territory with a view to covering some of it with extensions of the Pan American service, and to make a survey of the Maya country and search for ancient Maya ruins. Aerial photographs and maps were made of the territory, much of it remote and unexplored by white men, inhabited only by Indians. While flying over the Yucatan peninsula, the party discovered the ruins of an ancient Mayan city. The plane was in constant radio communication

with representatives of the Pan American line.

Col. Lindbergh flew a Sikorsky amphibion transport, powered with a Wasp engine. He was accompanied throughout the flight by Mrs. Lindbergh, Charles Lorber, co-pilot, and W. W. Ehmer, in charge of the radio work. Dr. Ricketson of the Carnegie Institute flew with the party over the southern part of Honduras, Yucatan and Guatemala, and Dr. Kidder of the Carnegie Institute flew over the Yucatan Peninsula and British Honduras.

## Menefee Field to Be Dedicated Nov. 2 and 3

**M**ENEFEE AIRPORT, New Orleans base of the Southern Air Transport, will be dedicated with a two-day air-meet and celebration November 2 and 3. Plans are being made for the participation of seventy Army, Navy and civilian planes at the event, according to an announcement of officials of S. A. T.

## UNIVERSAL AND W. A. E. PLAN 36-HOUR COAST TO COAST SERVICE

**F**ORMATION of a 36-hour New York-Los Angeles daily air service has been announced jointly by Universal Aviation Corporation, a division of the Aviation Corporation, and Western Air Express. The service will be inaugurated as soon as surveys are completed over the portion of the route not covered by airlines.

The Eastern division of the coast-to-coast airline will be established by Universal Aviation Corporation on a 1,135-mile route from New York to Kansas City. Preliminary flights over this route are scheduled to start on December 15 and upon their completion the service on this route will be opened. From Kansas City westward to Los Angeles passengers will fly on a 1,417-mile line of the Western Air Express which has been in operation for several months. Both the Universal Corporation and Western Air Express will use 12-passenger Fokker cabin monoplanes.

The trip from New York to Los Angeles on the Universal and Western lines will require an eleven-hour flight from New York to Kansas City, where an over-night stop

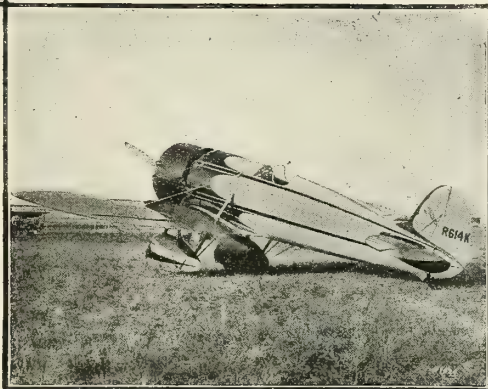
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The picture at right shows famous Travel Air "Mystery Ship"—fastest commercial plane ever produced—with an official record of 236 m. p. h. to its credit. Above, is shown the Travel Air sister ship to the "Mystery" plane.



The picture below shows a Travel Air six-place cabin monoplane equipped with a Wright J6 300-h.p. engine. A popular plane with business executives and with air lines.

## ONE VICTORY AFTER ANOTHER!



### Travel Air "Cleans Up" at Kansas City

First, it was a sweeping victory in the National Aeronautical Exposition at Cleveland . . . eight events in eleven starts won by Travel Air. Again, at the Kansas City International Exposition, the story runs, "Travel Air continues to win" . . . the Mexico to Kansas City Air Derby, Travel Air first place, also first, second and third places for the Travel Air "Mystery Ship," its sister ship and a Travel Air biplane, in the 800-Cubic Inch Event, the Free-For-All Speed Contests and the Stunting Contest. Once more, the "On to Tulsa Race," another victory for Travel Air. Travel Air has a way of building winners regardless of whether speed or reliability is required. A policy of building to the most exacting standard is responsible for the high degree of public confidence shown in Travel Air planes, and for the nation-wide popularity that Travel Air enjoys today. Our free catalog, "The Story of Travel Air," will be sent on request.

## TRAVEL AIR COMPANY

### WICHITA, KANSAS

THE STANDARD OF AIRCRAFT COMPARISON



(Continued from preceding page)  
will be made, and a twelve-hour flight from Kansas City to Los Angeles.

At present the lines of the Universal Aviation Corporation cover the mid-West from Omaha to Cleveland.

## NATIONAL GLIDER WEEK, NOV. 18-24

NATIONAL Glider Week will begin on November 18 under the supervision of the National Glider Association, which will conduct a country-wide publicity campaign to stimulate interest in glider flying and to encourage the formation of glider clubs. Speakers prominent in the aeronautical industry will talk on gliders in principal cities throughout the country, and the eighteen glider clubs affiliated with the national association will give public demonstrations of glider flying in the districts where they are located. Karl Betts is director of the campaign work.

November 18 is the first anniversary of the founding of the National Glider Association. It was established at Detroit by a group of glider enthusiasts headed by Edward S. Evans who had observed the interest and success of glider flying in Germany since the World War. The club was fostered with the object of popularizing motorless aviation in the United States, and during the past year eighteen affiliated clubs were formed.

## SIXTEEN AIR SCHOOLS NOW APPROVED

SIXTEEN flying schools throughout the United States have now been approved by the Department of Commerce, according to a recent report of departmental officials. The schools have received Approved School Certificates following examinations of their equipment, organization and instructors by inspectors of the Federal department. The practice of approving schools was adopted by the Department of Commerce in an effort to raise the standards of ground and flying schools, and to identify those schools providing the facilities deemed necessary by the Department.

Five schools were announced as approved

some time ago. They are as follows:

Airtech School of Aviation, Airtech Field, San Diego, Calif.  
Aero Corporation of Cal., Inc., Aero Corporation Field, Los Angeles, Calif.  
Embry-Riddle Flying School, Lunken Airport, Cincinnati, Ohio.  
Parks Air College, Inc., Parks Airport, East St. Louis, Ill.  
D. W. Flying Service, Inc., LeRoy Airport, LeRoy, N. Y.

The additional schools recently approved are:

Universal Flying School, Wold-Chamberlin Field, Minneapolis, Minn.  
Curtiss Flying Service of the Middle West, Curtiss Reynolds Airport, Glenview, Ill.  
Curtiss Flying Service, Valley Stream Airport, Valley Stream, L. I., N. Y., in combination with New York University, New York, N. Y.  
Universal Flying School, Lambert Field, St. Louis, Mo.  
Curtiss Flying Service, Grosse Isle Airport, Grosse Isle, Mich.  
Calif. Aerial Transport Flying School, Municipal Airport, Los Angeles, Calif., in combination with Western College of Aeronautics, Municipal Airport, Los Angeles, Calif.  
Curtiss Flying Service of the Middle West, Fairfax Airport, Kansas City, Mo.  
Porterfield Flying School, Fairfax Airport, Kansas City, Mo.  
Von Hoffman Aircraft School, Lambert Field, Anglum, Mo.  
Curtiss Flying Service, Oakland Airport, Oakland, Calif. (Flying); 1258 Russ Building, San Francisco, Calif., (Ground).  
T. C. Ryan Flying Service, Ryan Airport, 3300 Barnet Avenue, San Diego, Calif., in combination with Pacific Technical University, 2119 Kettner Boulevard, San Diego, Calif.

## Eighth Annual Asphalt Paving Conference West Baden Springs, Ind.

THE Eighth Annual Asphalt Paving Conference will be held at West Baden Springs, Indiana, October 28 to November 1. Paving and landing-field treatments with asphalt at airports, will come in for extensive discussion at the West Baden meeting by airport engineers and aviation officials,

led by Chief Engineer R. H. Simpson, who directed the paving of Port Columbus, O. Mark R. Thompson, engineer in charge of bituminous pavements for the Board of Public Service, of St. Louis, will give an illustrated address on experimental runway construction at Lambert-St. Louis Municipal Airport. Oiled runways for airports will be discussed by John A. Herlihy, chief engineer of the Transcontinental Air Transport, Inc.

## LT. MOORE REACHES HIGH ALTITUDE

LT. WILFORD MOORE of the Air Corps Reserve has set a new unofficial altitude record of 20,800 feet for light planes with a load equivalent to pilot and passenger. His barograph, sealed by an observer of the National Aeronautical Association, has been dispatched to Washington for official verification. Lieut. Moore took off from the Kansas City Municipal Airport in an Inland Sport monoplane carrying an oxygen tank. He was in the air for almost two hours, and at his peak altitude found a temperature of two degrees below zero. The official altitude record for light planes (881 pounds without load) is 19,800 feet established last year by Capt. Godfrey DeHavilland of England in a DeHavilland Moth.

## DORNIER BOATS TO BE BUILT IN AMERICA

THE American manufacturing rights of the Dornier Metallbauten of Friedrichshafen, Germany, have been acquired by the General Motors Corporation and the Fokker Aircraft Corporation of America. The general Motors and the Fokker corporations recently announced the incorporation of the Dornier Corporation of America at Wilmington, Delaware, to manufacture all-metal flying boats of the Dornier design, including the twelve-engined DO-X, which recently carried 169 passengers in a test flight at Lake Constance. It was also announced that General Motors arranged several months ago with Dr. Claude Dornier to supervise the American manufacture of Dornier all-metal planes.



New manufacturing plant of the Sikorsky Aviation Corporation at Bridgeport, Conn., and (left) a scene during the moving of the plant from College Point, L. I. The stock and machinery were moved at night so that production was not interrupted

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The Waco J-6 300's which placed first and second in the Annual National Air Tour held in October for the Edsel Ford Reliability Trophy demonstrated again the durability of Titanine standard airplane finishes. We congratulate the Waco Aircraft Co. and the winning pilots, John Livingston and Arthur J. Davis.

The Titanine products used on the Waco ships are Ti-Two red brown dope and pigmented dopes on fabric surfaces, and Regolac metal lacquer on cowlings, struts, and running gear.

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# 1929 BENNETT BALLOON RACE

By A. W. LEAGUE

COMPETING with eight other balloonists representing six nations, Ward T. Van Orman, piloting the *Goodyear VIII*, entry of the Goodyear Tire and Rubber Company, won the 1929 James Gordon Bennett International Balloon Race started from St. Louis on September 28. The 1929 event, eighteenth in a series of international contests which began in 1906, was won by the smallest mileage in the history of the race, due to lack of favoring winds. Pilot Van Orman, with Alan McCracken as aide, landed near Troy, Ohio, having covered a distance of 341 miles. The U. S. Army entry, piloted by Capt. E. Kepner, was second with a distance of 338 miles, and the U. S. Navy entry was third, having traveled 304 miles. The Belgian entry finished fourth, Danish fifth, French sixth, German seventh and eighth, and Argentine ninth. These distances were scaled by the U. S. Geological Survey.

The nine balloons drifted lazily as they took off from a field thirty-five minutes away from the St. Louis business district, at five-minute intervals starting at four o'clock, September 28. Drawing of lots by the pilots at a banquet held previously in their honor at the Hotel Jefferson, made the German balloon *Stadt Essen*, piloted by Erich Leinkugel and George Froebel, the first starter. The *Goodyear VIII*, the winning American entry, distinguished by its new white bag from the yellow foreign balloons, was the second starter. Argentina's balloon, the *Argentina* was third, piloted by D. Eduardo Bradley, with Francisco Cadaval as aide. The Denmark entry, with the name *Danmark* on one side, was piloted by Lieut. George Schenstrom with S. A. U. Rasmussen as his helper. The second German balloon, *Barmen*, was the fifth in the take-off. Dr. Hugo Kaulen, Jr., Germany's 26-year-old balloonist, was the pilot of the craft. The

## History of the Bennett Balloon Race in Figures

### Winners of the First James Gordon Bennett Cup

Year	Winner	Country	Starting Place	Distance (miles)
1906.....	Lieut. Frank P. Lahm	America	Paris	402
1907.....	Oskar Erbsloh	Germany	St. Louis	872
1908.....	Col. Oberst Schaeck	Switzerland	Berlin	753
1909.....	E. W. Mix	America	Zurich	696
1910.....	Alan R. Hawley	America	St. Louis	1173
1911.....	Hans Gericke	Germany	Kansas City	471
1912.....	M. Bienaime	France	Stuttgart	1334
1913.....	Ralph Upson	America	Paris	384
1920.....	Ernest Demuyter	Belgium	Birmingham	1098
1921.....	Paul Armbruster	Switzerland	Brussels	476
1922.....	Ernest Demuyter	Belgium	Geneva	852
1923.....	Ernest Demuyter	Belgium	Brussels	717
1924.....	Ernest Demuyter	Belgium	Brussels	444

### Winners of the Second James Gordon Bennett Cup

1925.....	A. Veenstra	Belgium	Brussels	836
1926.....	W. T. Van Orman	America	Antwerp	535
1927.....	Edward J. Hill	America	Detroit	745
1928.....	Capt. W. Kepner	America	Detroit	460

### Winner of the Third James Gordon Bennett Cup

1929.....	W. T. Van Orman	America	St. Louis	341
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### Record of Winners by Nations

Country	No. times winner	Country	No. times winner	Country	No. times winner
Belgium	5	Switzerland	2	Italy	0
United States	8	France	1	Spain	0
Germany	2	Great Britain	0	Austria	0

next balloon was the *Belgica*, entered by Belgium and piloted by Capt. Earnest Demuyter. Capt. Demuyter won the Gordon Bennett Races for 1920, 1922, 1923, and 1924, making the first Gordon Bennett Trophy the permanent possession of Belgium. The *Belgica*, in the course of repairs made after its arrival in St. Louis was turned inside out, and was inflated while in that condition. Frans Lecharlier was aide on the Belgian balloon. The next take-off was that of the linen-colored United States Navy balloon, piloted by Lieut. Thomas Settle with Lieut. Winfield Bushnell as aide. The eighth balloon to take off was the United States Army balloon, piloted by Capt. William E. Kepner of Scott Field, with Capt. James F. Powell as aide. Capt. Kepner was the winner of the 1928 race from De-

troit. This victory made the United States the permanent holder of the Second James Gordon Bennett trophy. With the band playing "La Marseillaise" the French balloon, the *Lafayette*, was the last to take-off at 4:40 p.m. George Blanchet, pilot of the *Lafayette* had an American aide, Howard Scholle.

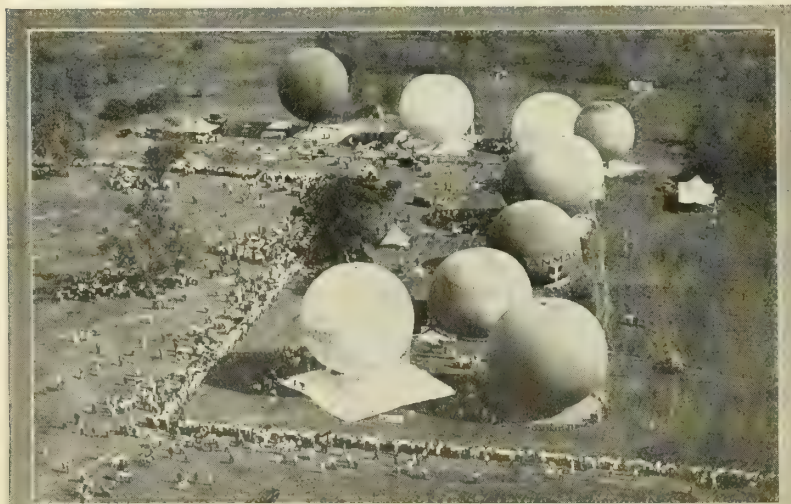
Approximately 1,000,000 cubic feet of gas was required to inflate the balloons entered in the race. The gas was pumped into the balloons through a special six-inch pipe having a pressure of about seven pounds, sufficient to give a flow of more than 100,000 cubic feet per hour. Work of inflating the balloons started about 7 o'clock on the morning of the race and was continued uninterruptedly until 4 o'clock in the afternoon. when the bags started to take to the air.

Storms forced the German bag *Stadt Essen* and the French entry down, and the rest of the balloons, except the *Argentina* and the *Barmen*, were forced to land because of lack of ballast. The *Argentina* was forced to land because of an accidental pull of the rip cord when the pilot attempted to valve the gas, and the *Barmen* landed because the balloon had struck a current of air that was carrying it back to St. Louis.

The approximate distances covered by the respective entrants are as follows: *Goodyear VIII*, 341; U. S. Army, 338; U. S. Navy, 304; *Belgica*, 226; *Danmark*, 209; *Lafayette*, 200; *Barmen*, 171; *Stadt Essen* 169; *Argentina*, 155.

Maj. Albert Bond Lambert, chairman of the Air Board Technical Committee and member of the contest committee of the National Aeronautic Association, was the official starter of the race. Alan Hawley acted as official referee, Paul McCullough was the official measurer of the balloons, and Carl Meyer acted as official timer.

Accompanying is the listed history of the  
(Continued on next page)

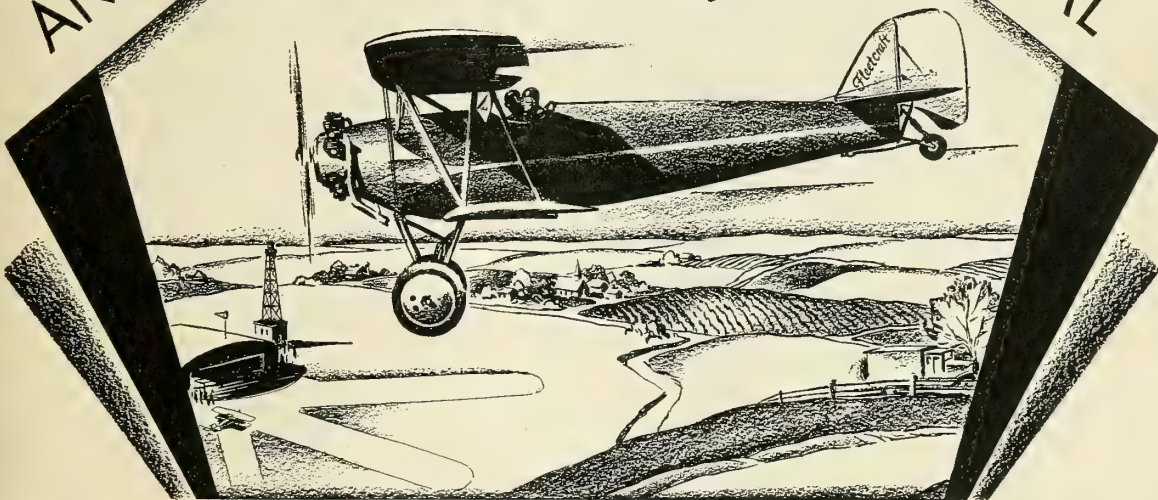


View of the balloons in the James Gordon Bennett Balloon Race shortly before the start of the annual event

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Ward T. Van Orman, winner of the Bennett Balloon Race, being congratulated by Capt. Demuyter, pilot of the Belgica.

(Continued from preceding page)

James Gordon Bennett Balloon Trophy. The first cup was retained by Belgium after winning it three times; the second was kept by the United States, following its 1928 victory. The third trophy, which was presented this year for the first time, was provided by the Detroit Chamber of Commerce.

#### Schlee-Brock Aircraft Corp. Acquires Canadian-American Airline

THE Schlee-Brock Aircraft Corporation of Detroit has acquired the Canadian-American Airlines, Inc., operating between St. Paul and Winnipeg, Canada, and has inaugurated increased passenger service on the line. The Schlee-Brock company has also purchased a field at Minneapolis which will be developed into a terminal from which planes of the Canadian-American line will be operated next spring. The Schlee-Brock corporation also operates the Arrowhead Air Lines between Duluth and Port Arthur.

The Canadian-American Airlines operated for several months before the Schlee-Brock corporation acquired control. A Travel-Air six-place monoplane was operated by the company on a schedule of three round trips a week. Under the supervision of the Schlee-Brock company the Canadian-American airline will supplant a rail service of fifteen hours each way from the Twin Cities to Winnipeg, making a four-hour flight with four stops. The terminals which will be used are located at St. Paul municipal field, Wold-Chamberlin Field, the municipal fields at St. Cloud, Fargo and Grand Forks, and Stevenson Field at Winnipeg. Lockheed cabin monoplanes will be used and connections will be made later with the Arrowhead Air Lines.

The Canadian-American Airlines and the Arrowhead Air Lines will be operated throughout the winter, and planes will be equipped with skis for landings and take-offs.

The officers of the Canadian-American Airlines, Inc., are as follows: William S.

Brock, president; Col. Ralph W. Webb, E. F. Schlee, H. D. Putnam, vice presidents; J. F. Gould, secretary; A. G. Schlee, treasurer, and F. D. Blair, assistant secretary and treasurer.

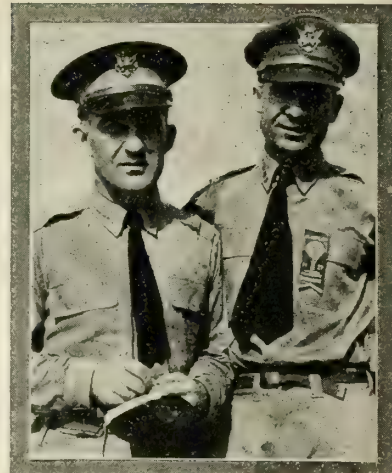
The Schlee-Brock Corporation is agent for the Bach Aircraft Company of Los Angeles, Lockheed Aircraft Company of Los Angeles and the New Standard Aircraft Company of Paterson, N. J. Headquarters are located on the municipal airport at Detroit.

#### Two-hour Glider Flight Made at Cape Cod School

A GLIDING record for the Cape Cod Glider School at Cape Cod, Mass., of two hours and seven minutes was established recently by Rolf von Chlingsenberg, instructor at the school. Von Chlingsenberg's flight was made near the school in a thirty-mile wind during a drizzling rain. The American gliding record is four hours and five minutes made in 1928 by Peter Hasselbach. Von Chlingsenberg's time is the greatest that has been reported in 1929.

#### SCHEDULE OF COMING AERONAUTIC EVENTS

- November 5-7. Omaha Aviation Show, Omaha, Neb.
- November 8-9. Air Meet and Dedication of Bates Field, Mobile, Ala.
- November 9-16. Western Aircraft Show, California Aircraft Exposition Association, Los Angeles, Cal.
- November 12-13. Aeronautical Meeting of the Society of Automotive Engineers, Los Angeles, Cal.
- December 1-9. International Aeronautical Exposition, Chicago.
- December 4-5. Dedication of Roswell, New Mexico, Airport.
- December 9-14. First Annual Baltimore Aircraft Show, Fifth Regiment Armory, Baltimore, Md.
- December 10-16. First Mexican Airshow, Mexico City, Mexico.
- January 13, 14, 15. Miami All-American Air Meet, Miami, Florida.
- January 13. Aeronautical Meeting of the Society of Automotive Engineers, Miami, Fla.
- January 21. Aeronautical Meeting of the Society of Automotive Engineers, Detroit, Mich.—aeronautical session at annual meeting of S. A. E.
- February 7-15. Second Annual New York Aviation Show, Aviators Post No. 743, American Legion, New York City, N. Y.
- February 15-23. International Class-A Aircraft Show, St. Louis, Mo.
- April 5-13. Third all-American Aircraft Show, Detroit Board of Commerce, Detroit, Mich.
- April 8-9. Two-day meeting of S. A. E. during Detroit Aircraft Show.
- May 3-10. New York Aircraft Show, Aeronautical Chamber of Commerce, Madison Square Garden, New York City, N. Y.



Times Wide World Photo

Kepner and Powell who manned the Army's entry in the Bennett Balloon Races.

#### FIRST COMMODORE DELIVERED TO N.Y.R.B.A.

THE first Commodore twenty-passenger flying boat has been built by the Consolidated Aircraft Corporation of Buffalo, N. Y., for the New York, Rio and Buenos Aires Line, Inc. The ship was flight-tested at Buffalo and then flown to Washington where it was christened the *Buenos Aires* by Mrs. Herbert Hoover in ceremonies held at the Naval Air Station. It will be placed into service on the Buenos Aires-Rio de Janeiro division of the New York, Rio and Buenos Aires Line. The Consolidated Company expects to build and deliver twelve of these ships for the airline.

The Commodore is the commercial version of the PY-1 Naval Patrol Boat which the Consolidated corporation is building in quantity for the Navy Department. The Commodore was designed to carry thirty-two passengers, but it was altered to accommodate twenty passengers, express and mail.

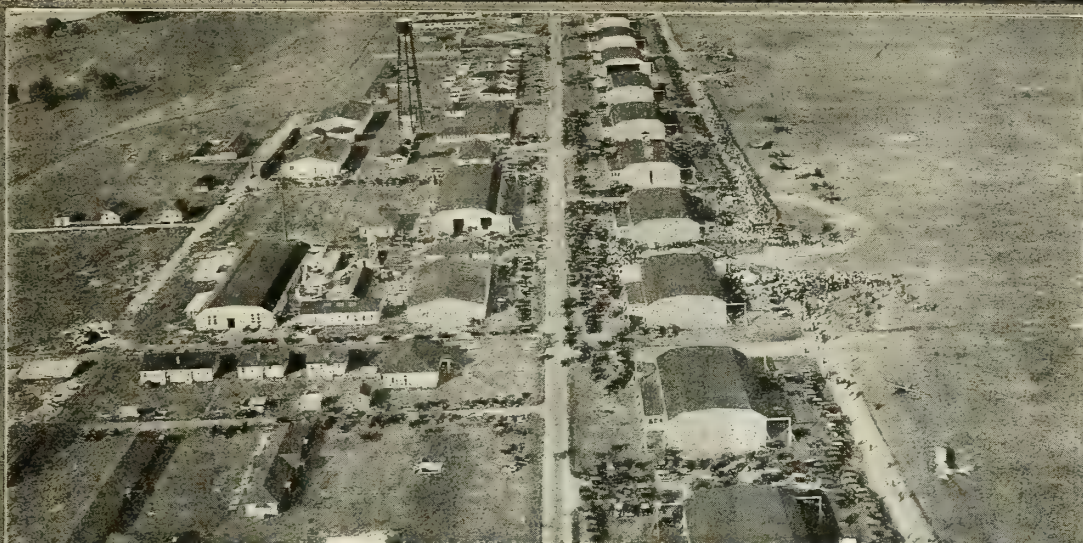
The Consolidated Commodore is described in the Technical Section of this issue.

#### Pacific Zeppelin Transport Formed

THE Pacific Zeppelin Transport Company, Ltd., has been incorporated under the laws of Delaware, to develop a thirty-six hour airship service between cities on the coast of California and Hawaii, with the prospect of extending the service to the Philippines and Japan. The Pacific Zeppelin Transport Company will be an all-American concern.

THE Cord Corporation, a holding company in the automotive industry, has completed negotiations for procuring the stock of the Stinson Aircraft Company of Wayne, Michigan, on an exchange basis with a cash alternative. The combination of the Stinson and Cord interests will, according to a statement by Mr. Stinson, give the aircraft concern a source of engines. Concerns operated by the Cord Corporation include the Auburn Automobile Company, Lycoming Manufacturing Company, Duesenberg, Inc., and Columbia Axle Company.





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[ Below: View of business district, Dallas, Texas ]



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### Production of Chevrolair Engines Planned

ARTHUR CHEVROLET, designer and manufacturer of automobile engines, has completed a four and six-cylinder in line air-cooled, inverted aircraft engine known as the Chevrolair. The Department of Commerce has completed manufacturer's certificate tests and it is planned to manufacture the Chevrolair engine in a plant at Indianapolis. In addition to the four and six-cylinder models, production later is expected to include eight and twelve-cylinder models. Officers of the company to produce and distribute the Chevrolair engine include Arthur Chevrolet, president; Frederick E. Schortemeier, vice-president; Gordon S. Griffin, vice-president; Byron P. Prunk, vice-president, and Otto A. Kuehrmann, secretary-treasurer.

### Lambert Engine and Mono Aircraft Sales Report for August

COMBINED shipments of planes and engines for the month of August by Mono Aircraft Corporation and Lambert Aircraft Engine Corporation, subsidiaries of Allied Aviation Industries, Inc., represented an increase of 70.6% and 44.4% respectively over the average rate of shipment for the twelve months preceding Allied control which became effective on May 1, 1929. A total of 29 planes and 39 engines were shipped by these two companies in August. During the four months following May 1, shipments of planes represented an average increase of 23.8% per month, and the average shipment of engines per month increased 7.4% per month over the preceding twelve months.



Arthur Chevrolet, designer of the Chevrolair engines.

Allied Aviation Industries, Inc., has purchased the Royal Airways of Madison, Wis., including the Royal airport, a flying school in operation at the airport, and distribution facilities for the sale of aircraft, engines and accessories in Wisconsin.

### Curtiss Exports \$2,125,000

EXPORT orders for airplanes, engines and parts received since January 1st, 1929, by the Curtiss Aeroplane Export Corporation amount to more than 57 per cent of

the total exports of these products from the entire United States for the full year of 1928. The orders received since January 1st of this year by the Curtiss export firm amounted to \$2,125,000, a large percentage of which was for commercial aviation in various countries abroad. Of this total, approximately \$300,000 was for engines alone, and \$360,000 for aircraft parts, leaving \$1,425,000 representing the export orders for fully-equipped planes.

The total exports of planes, engines and aircraft parts from the United States for the full year of 1928 amounted to \$3,664,723. In nine months of the present year, the Curtiss Export Company alone has handled a business equal to more than 57 per cent of the total figure for the United States last year.

### Chinese Government Orders Stinson Planes for Air Mail

THE Chinese Nationalist Government has ordered for immediate delivery two six-place Stinson-Detroiters and two four-place Stinson Junior cabin monoplanes from the Stinson Aircraft Corporation of Wayne, Mich. Both models will be powered with Wright Whirlwinds, the Stinson-Detroiters equipped with 300-horsepower engines and the Stinson Juniors powered with 225-horsepower engines.

The planes will be used to augment the service of the first Chinese air-mail route established June 8, with daily round trips between Shanghai and Nanking, a distance of 165 miles. Four Stinson-Detroiters were used to inaugurate the Chinese mail service.

## AIRWORTHINESS CERTIFICATES FOR EXPORT

THE participation of American aeronautical export trade in foreign markets is limited to a degree as the result of the International Aerial Navigation Conference which was held at Paris in 1919. While the effect of this conference is still felt, the limitation on American aircraft exports prevails only in the European and Australian markets. Exports to South America and the Orient were in no way influenced by the conference, and airplane licenses are issued according to the regulations of the South American or Far Eastern countries. Exports to Canada are regulated by a reciprocal agreement concerning airworthiness certificates, Canada being the only country with which such an arrangement for the export of aeronautical products has been made by the United States.

It is in the European and Australian fields that the American export trade has approached a limitation that is more or less marked as a result of the International conference. The signatory nations at the conference undertook to prohibit the importation of aircraft unaccompanied by a certificate of airworthiness issued or indorsed by a state which was a party to the convention. The United States was not a signatory nation to the conference, and was included in the embargo placed on non-signatory nations. American aircraft are limited, but not wholly excluded, as a result.

There has been a movement in the United States to rewrite the Paris convention and establish a new international code governing airplane manufacture and certificates of airworthiness. With the United States as a signatory nation to the code, aeronautical exports to Europe and Australia would not be limited by the embargo which resulted from the Paris conference.

With such a change effected the United States would probably extend the reciprocal agreement in operation with the Canadian Government to other nations. The procedure in effect under this reciprocal agreement requires manufacturers of aircraft to submit an application for certificate of airworthiness for export in triplicate form to the Aeronautics branch of the Department of Commerce. Three-view general assembly drawings must also be submitted in triplicate. An airplane which is being exported to Canada may be inspected either in the ordinary routine of factory inspection, or by a field inspector, and an inspection report submitted. The application and inspection report are checked for completeness and a Certificate of Airworthiness is made out in triplicate. The original certificate is returned to the applicant and must accompany the aircraft to be exported. A copy is forwarded to the Comptroller of Civil Aviation in Canada and the second copy is retained by the Aeronautics Branch.

### Three Waco Planes Shipped to San Salvador, Central America

THREE Waco 225 Taper-Wings were shipped recently from the plant at Troy, Ohio, to San Salvador, Central America, for use by the national government. The Waco Aircraft Company will send a representative to instruct the native pilots and mechanics in the rigging and care of the ships.

### Export Sales of Ryan Planes

THIRTY Ryan Broughams have been shipped to foreign countries over a period of 18 months by the Ryan Aircraft Corporation of St. Louis, according to a report of company officials. Nine planes were shipped to China and nine to Mexico; three planes went to Guatemala and three to Canada; and one plane each was exported to Italy, England, Japan, Australia, Argentina and New Guinea. The planes, with spare parts, had a total valuation of \$390,000.

### Command-Aire to Sell Own Planes

EFFECTIVE November 1, Command-Aire, Inc., of Little Rock, Ark., will market the planes manufactured by its factory through its own sales organization according to an announcement of officials of the firm. The organization has withdrawn from its connection with the Curtiss Flying Service which formerly sold Command-Aire planes through the Curtiss sales agencies.



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neat job, too



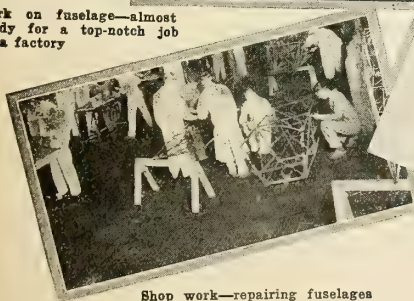
General Shop  
in action



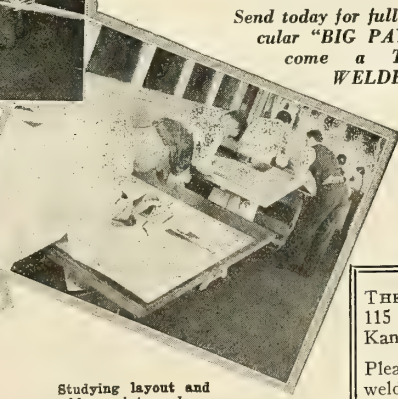
Work on fuselage—almost  
ready for a top-notch job  
in a factory



Shop work—repairing fuselages



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# ORGANIZING THE D. C. AIR LEGION

By ALVA SOLE, *President*

THE D. C. Air Legion was organized in March, 1928, in Washington, D. C., by twenty men and two women who desired to learn to fly, and who did not feel financially capable of paying the thirty dollars per hour charged at the local fields for training. They also wanted a thorough ground course before taking their flying work, and there was no school in Washington at that time giving a ground course.

This twenty and two organized the D. C. Air Legion and elected temporary officers. The membership grew so that within two or three weeks it was felt that a sufficient number had come in to warrant the starting of a ground school course and the opening of an office and class room. A classroom was hired in the center of the city, and the first ground school class was started with a former naval officer as ground school instructor.

The Legion took hold and grew. A second ground school class was organized, and a third, fourth, fifth and now a sixth class is under way. These classes formerly consisted of twenty-four lectures, held three times each week, but upon the promulgation of the Department of Commerce Air School Supplement, our course was reorganized to conform with these regulations.

Last October it was decided that a sufficient number of Legionnaires had completed the ground school course to make the purchase of a plane desirable and practicable. It was decided that this plane should be purchased by the members who desired to learn to fly, putting up whatever sum of money they could to apply on what was called "advance flying time," with the understanding that when the ship arrived they should purchase flying time at the rate of fifteen dollars per hour, seven dollars and fifty cents to be paid in cash and used for operation expenses, and seven fifty to be charged to their advance flying account.

In this manner the sum of thirty-six hundred and fifty dollars was raised and a bi-plane, recommended by our pilot as the best ship to purchase for flight training, was purchased. The plane was received during the latter part of November and during the month of December we flew eighty-nine instruction hours,—and we have been at it ever since. Up to the present we have had about a thousand hours instruction.

Most of our members were hour by hour flyers. That is, they would get enough money to fly an hour, sign up for the hour, take it and hope they would soon get enough to fly again. In spite of that fact we have kept two pilots busy for the last several months. Each member is expected to buy his ticket, calling for a half hour lesson, when he makes his appointment. Soloists are not expected to put up any bond, as this would defeat the very purpose of our club. We had one crackup and we sold flying time enough to make the necessary repairs. We have been solvent at all times since our organization and are so at present.

We have had several bumps since our organization. Our first secretary went haywire. Our first ship was also a mistake as we were advised by our pilots after we were compelled to dismiss our first pilot: he had flown our students as high as twenty-five hours in the front cockpit. Each pilot we had test the plane after that assured us that it was not a proper plane for student solo work, and that it would spin and not come out. We sold this plane then, practically new at sixteen hundred and fifty dollars, two thousand dollars less than we paid for it. We have had other set-backs which we would be able to avoid with the knowledge we have gained, and we feel that with this knowledge we would be able to organize a club in any town of proper size in two weeks and put them on the road to success with a plane, a surplus and a system that would keep them off the rocks.

One of our members, William H. Hottel, completed our ground school course and took nearly enough dual instruction to be able to solo and then got a position as manager of the T. A. T. field at Waynoka, Oklahoma. Another of our students, an expert mechanic, got his mechanic's license and obtained a position with the Pan-American Airways. And we have several members who will soon have their limited commercial pilot's license and go passenger hopping. Three of our members have purchased their own planes in order to build up time. So we feel that already our members are commencing to reap the benefits of the Legion.

We wish, just for the joy of accomplishment, that we could have half of the Guggenheim ten thousand dollars to spend organizing worth-while clubs throughout the United States. We feel further that the Flying Club, operated along business lines, is the real solution to the pilot shortage problem.

## N. A. C. A. REPORTS

*Trials of Los Angeles Are Subject of N.A.C.A. Report No. 318*

REPORT No. 318 of the National Advisory Committee for Aeronautics, entitled "Speed and Deceleration Trials of the U. S. S. *Los Angeles*," reports trials instigated for the purpose of determining accurately the speed and resistance of the U. S. S. *Los Angeles* with and without water recovery. The trials were also conducted to clear up apparent discrepancies between the speeds attained in service and in the original trials in Germany. Four different instruments were used for measuring the air speed: the ship's Venturi air speed meter, a Pitot static tube, an apparatus having separate static and impact orifices, and the ship's electric air speed meter of the suspended windmill type.

A series of speed trials with the water recovery apparatus were conducted while returning on a trip from Harrisburg to Lakehurst. Each trial was of four minutes

duration and runs were made at four different rates of engine revolution. The results obtained proved conclusively that the water recovery apparatus increases the air resistance about 20 per cent. The speed trials without water recovery were held over a triangular course between Sandy Hook, Staten Island, and Rockaway. Two complete runs were made around this course, each in opposite directions. Between the results obtained in these trials without water recovery apparatus and those in Germany there was a discrepancy of nearly 6 per cent in speed at a given rate of engine revolution. Warping of the propeller blades and small cumulative errors of observation were given as the most probable causes of the discrepancy.

The National Advisory Committee for Aeronautics and the Goodyear-Zeppelin Corporation loaned apparatus and personnel to assist in the trials at the request of the Bureau of Aeronautics of the Navy Department.

### N. A. C. A. Report No. 319

REPORT No. 319 of the National Advisory Committee for Aeronautics, entitled, "The Aerodynamic Characteristics of Twenty-four Airfoils at High Speeds," by L. J. Briggs and H. L. Dryden, gives the aerodynamic characteristics of 24 airfoils at various speeds measured in an open-jet air stream two inches in diameter. The models used in the tests described had a one-inch chord, and were divided into four general groups. The first group was comprised of the standard R.F.A. family in general use by the Army and Navy for propeller design. The second group consisted of members of the Clark Y family, while the third group was a second R.F.A. family in which the position of the maximum ordinate was varied. The fourth group consisted of three geometrical forms, a flat plate, a wedge, and a segment of a right circular cylinder.

### National Advisory Committee Report 312

REPORT No. 312 of the National Advisory Committee for Aeronautics, entitled, "The Prediction of Airfoil Characteristics" describes and develops methods by which the aerodynamic characteristics of an airfoil may be calculated with sufficient accuracy for use in airplane design. These methods of prediction are based on the present aerodynamic theory and on empirical formulae derived from data obtained in the N. A. C. A. variable density wind tunnel at a Reynolds number corresponding approximately to full scale.

### Aerodynamic Theory and Test of Strut Forms—N. A. C. A. Report No. 311.

EXPERIMENTS on the aerodynamic theory and testing of strut forms are reported by R. H. Smith and published by the National Advisory Committee for Aeronautics in two reports, the first of which is No. 311. In this part the symmetrical inviscid flow about an empirical strut of high service merit is found by both the Rankine and the

(Continued on next page)

# Can You Say This About the Plane You Sell?

CHARLES F. DYCKER, PRES.  
MEMBER  
PROFESSIONAL PILOTS' ASSOCIATION  
TREASURER  
CALIF. AIRCRAFT OPERATORS' ASSOCIATION  
EDW. A. DYCKER, VICE-PRES.



September 7, 1929

Lincoln Aircraft Company,  
Lincoln, Nebraska.  
Att: Mr. Victor Roos.

Gentlemen:

The carload of Lincoln PT's arrived September 6 in perfect condition, with not even a slight tear in the fabric. Obviously, we share your enthusiasm for the new trainer, and from recent developments are confident we will have a generous share of sales with this equipment. We approve of the finish of this plane both as to color and material and believe it is more attractive than any stock finish of other planes.

It is our belief at this time, that we will be in a position to place an order for an additional carload within the next week or two and trust that you will be able to make prompt shipment at that time.

Thanking you for your kind attention to this order.

Respectfully,

Edward A. Dycer.

The LINCOLN PT  
Carries Approved Type  
Certificate No. 181 of  
the Dept. of Commerce.

**M**R. DYCKER is certainly enthusiastic about the LINCOLN PT. And also about Lincoln service. Are you as enthusiastic about the training plane you sell?

Flying schools find the LINCOLN PT a most practical plane. Its rugged strength makes it hard to damage. And the low cost combined with low upkeep makes it unusually economical. Know more about this remarkable plane—why it is the coming plane for big sales. Mail Coupon for complete information!

LINCOLN AIRCRAFT CO., Inc.

LINCOLN, NEBR.

VICTOR H. ROOS, President and Gen'l. Mgr.

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THIS COUPON

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Gentlemen: Please send me  
complete FREE Literature  
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# LINCOLN PT.

A TWO-PLACE PLANE FOR TRAINING, SPORT OR BUSINESS

Name .....  
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(Continued from preceding page)

Joukowski methods. Theoretical stream surfaces as well as surfaces of constant speed and pressure in the fluid about the strut are found. From the theoretical flow speed the surface friction is computed by an empirical formula.

### American Nautical Almanac Supplement "Lunar Ephemeris for Aviators"

THE Naval Observatory has issued the aeronautical supplement to the American Nautical Almanac called "Lunar Ephemeris for Aviators," listing moon

tables to enable a navigator quickly to reduce simultaneous observations of the sun and moon to determine his position. The supplement was prepared by the ephemeris department of the United States Naval Observatory and embodies ideas originally suggested by Lieut. Commander P. V. H. Weems of the United States Navy.

The Greenwich hour angle of the moon, with its variations per minute and the declination of the moon for every ten minutes of Greenwich civil time, are given. The moon's semi-diameter and horizontal parallax are given for every eight hours. The

supplement is not designed for use apart from the American Nautical Almanac, as the explanations covering the arrangements and use of the tables are printed in the almanac only.

THE Standard Oil Companies of California, Indiana and New Jersey have published an aircraft oil chart of Stanavo oils produced by them. These companies have formed a board of chemists and engineers to recommend oils for aircraft, which are now being sold under the Stanavo name. There are three grades of the oil recommended by the board, known as numbers 100, 120, and 140. The grade numbers designate the nominal viscosities of the respective oils at 210 degrees Fahrenheit. The chart published indicates the correct grade of Stanavo oil for use in most of the types of aircraft engines manufactured in the United States.

## RECENT APPROVED TYPE CERTIFICATES

Airplanes listed below have received Approved Type Certificates subsequent to those listed in the September, 1929, issue of AERO DIGEST, and are supplementary thereto:

Key: P—place; O—open; C—closed; L—landplane; Am—amphibion; S—seaplane; Conv—convertible; Fb—flying boat; B—biplane; M—monoplane.

ATC No.		Weight Empty	Useful Load	Gross Weight
172	Bach, 3-CT8, 10PCLM (2 Wright 165, 1 P&W 525).....	4,785	3,195	7,980
173	Stout, 6-AT, 15 PCLM (3 Wright 300).....	7,048	5,096	12,144
174	Nicholas Beazley, NB-3, 3POLM (LeBlond 65).....	744	629	1,373
175	Travel Air, SA-6000A, 6PCSM (P&W 450).....	3,676	1,824	5,500
176	Laird, LCR-300, 3POLB (Wright 300).....	1,922	1,088	3,010
177	Cunningham-Hall, PT-6, 6PCLB (Wright 300).....	2,680	1,670	4,350
178	Alliance Argo, 2POLB (Hess Warrior 115).....	1,077	538	1,615
179	Parks, P-1, 3POLB (Curtiss 90).....	1,331	747	2,078
180	Timm Collegiate, 2POLM (Kinner 90).....	1,309	643	1,952
181	Lincoln, PT, 2POLB (Curtiss 90).....	1,428	540	1,968
182	Curtiss Fledgling Jr., 2POLB (Curtiss 170).....	1,921	671	2,592
183	Boeing, 40-B4, 5PCLB (P&W 525).....	3,809	2,271	6,080
184	Command-Aire, 5C-3, 3POLB (Curtiss 170).....	1,482	878	2,360
185	Command-Aire, 5C-3A, 3POLB (Hispano).....	1,610	913	2,523
186	Swallow, TPK, 2POLB (Kinner 90).....	1,170	530	1,700
187	Stearman, LT-1, 5PCLB (P&W 525).....	3,890	2,260	6,250
188	Travel Air, DE-4000, 3POLB (Wright 165).....	1,695	1,007	2,702
189	Travel Air, BC-4000, 3POLB (Curtiss 170).....	1,793	1,007	2,800
190	Alexander, A-15, 3POLB (Kinner 90).....	1,423	838	2,261
191	Curtiss Fledgling, 2POLB (Curtiss 170).....	1,990	696	2,686
	With modifications for military use.....	2,005	696	2,701
192	Metal Aircraft, G-2W Flamingo, 8PCLM (P&W 450).....	3,370	2,430	5,800
193	Curtiss Condor, CO, 21PCLB (2 Curtiss 600).....	11,352	6,326	17,678
194	Stinson, SM-2AC, 4PCLM (Wright 225).....	2,091	1,126	3,217
195	Spartan, C-35, 3POLB (Wright 165).....	1,617	968	2,585
196	Pittsford, PA-6B, 3POLB (Wright 225).....	1,820	1,200	3,020
197	Moth, 60-GM, 2POLB (Gypsy 85).....	1,027	621	1,650
198	New Standard, D-29, 2POLB (Cirrus 85).....	1,097	535	1,632
199	Crown, B3, 2POLB (Kinner 90).....	1,243	513	1,756
200	Parks, P-2, 3POLB (Axelson 115).....	1,458	860	2,318
201	Mono Coach, 4PCLM (Wright 220).....	1,919	1,173	3,092
202	Golden Eagle Chief, 2POLM (LeBlond 90).....	966	513	1,479
203	Aeromarine-Klemm, AKL-26, 2POLSM (LeBlond 65)— Landplane.....	940	650	1,590
	Seaplane, with Edo floats.....	1,000	590	1,590
204	Aeromarine-Klemm, AKL-26A, 2POLSM (LeBlond 65)— Landplane.....	954	636	1,590
	Seaplane, with Edo floats.....	1,090	500	1,590
205	Travel Air, K-4000, 3POLB (Kinner 90).....	1,340	940	2,280
206	Boeing, 80-A, 20PCLB (3 P&W 525).....	10,582	6,918	17,500
207	Cessna, DC-6, 4PCLM (Curtiss 170).....	1,221	1,767	2,988
208	Kreider-Reisner, C-4D, 3POLB (Curtiss 170).....	1,462	901	2,363
209	Command-Aire, 3C-3B, Trainer, 2POLB (Siemens 110).....	1,340	776	2,022
210	General Aircraft, 102-B, 3PCLM (Wright 165).....	1,524	782	2,306
211	Boeing, 203-A, 3POLB (Wright 165).....	1,789	788	2,577
212	Stinson, SM-1FS, 6PCSM (Edo floats).....	3,198	1,502	4,700
213	Curtiss Falcon, 2POLB (geared Curtiss 600).....	3,367	1,898	5,265
214	Command-Aire, 5C-3B, 3PCLB (Axelson 115).....	1,503	869	2,372
215	Kreider-Reisner, C-6B, 2POLB (Kinner 90).....	1,015	535	1,550
216	New Standard, D-29A, 2POLB (Kinner 90).....	1,075	535	1,610
217	Stinson, SM-6B, 8PCLM (P&W 450).....	3,496	1,854	5,350
218	Monoprep, 2POLM (Velle 55).....	783	505	1,288
219	Loening Commuter, 4PCAMB (Wright 300).....	2,780	1,220	4,000
220	Curtiss Robin, J-1, 3PCLSM (Wright 165)— Landplane.....	1,542	2,118	3,660
	Seaplane.....	1,790	1,870	3,660
221	Curtiss Robin, J-2, 3PCLM (Wright 165).....	1,565	1,035	2,600
222	Fokker, FX-1A, 8PCAM (Cyclone 525).....	4,470	2,430	6,900
223	Kreutzer, K-5, 6PCLM (3-Kinner 90).....	2,745	1,698	4,443
224	New Standard, D-25A, 5POLB (Wright 225).....	2,055	1,290	3,345
225	New Standard, D-26A, 3POLB (Wright 225).....	2,055	1,345	3,400
226	New Standard, D-27A, 1POLB (Wright 225).....	2,055	1,345	3,400
227	Lockheed Vega, 2PCLM (P&W 450).....	2,490	1,775	4,265
228	Great Lakes, ZL-TIA, 2POLB (Cirrus 90).....	1,002	578	1,580
229	General, 111-C, 2POLM (Warner 110).....	1,206	535	1,741
230	Nicholas Beazley, NB-3V, 3POLM (Velle 55).....	772	629	1,401
231	Nicholas Beazley, NB-3G, 3POLM (Genet 80).....	735	629	1,364
232	Rearwin, 2000-C, 3POLB (Challenger 170).....	1,495	885	2,380
233	Command-Aire, 5C-3C, 3POLB (Wright 165).....	1,559	931	2,490
234	Pokker, FX-1V, 7PCLM (P&W 525).....	4,346	2,854	7,200
	Mail plane, 1PCLM (P&W 525).....	4,245	2,955	7,200
235	Mercury, Chic T2, 2POLM (LeBlond 65).....	935	578	1,513
236	Curtiss Thrush I, 6PCLM (Wright 225).....	2,260	1,540	3,800
237	Curtiss Carrier Pigeon, 1POLB (Conqueror 600).....	4,210	3,390	7,600
238	Simplex W2S, 2POLM (Warner 110).....	1,152	627	1,779
239	Brunner Winkle Bird B, 3POLB (Kinner 90).....	1,199	781	1,980
240	Waco, CS225, 3POLB (Wright 225).....	1,662	938	2,600
	Without center section tank.....	1,628	922	2,600
241	Moreland M1, 3POLM (Wright 220).....	2,000	800	2,800
242	Fairchild, 4PCLM (Wright 300).....	2,842	1,448	4,300
243	Cessna DC-6A, 4PCLM (Wright 300).....	1,932	1,248	3,180
244	Cessna DC-6B, 4PCLM (Wright 225).....	1,871	1,229	3,100
245	Bellanca PM-390 4PCLM (Wright 300).....	2,290	2,310	4,600
246	Ford (Stout) 7AT, 15PCLM (P&W 450 & 2-Wrights 300) Without center section tank.....	7,280	5,630	12,910
		7,230	5,530	12,560

## NEW TRAINING PLANE BUILT IN FT. WORTH

By CAPT. W. H. SCOTT

A NEW training plane is being built by George F. Bischof of Fort Worth, one of the oldest licensed mechanics in the country. Particular stress has been laid in this plane upon stability, resistance, low landing speed, patented landing gear, brakes and an improved patented adjustable stabilizer. A state of Texas charter for a \$1,000,000 corporation has been granted by Governor Dan Moody for the company to produce the plane. Over 20 orders have already been received for the new plane from northern schools, and seven planes have been ordered locally. The ship will be powered with a radial type motor.

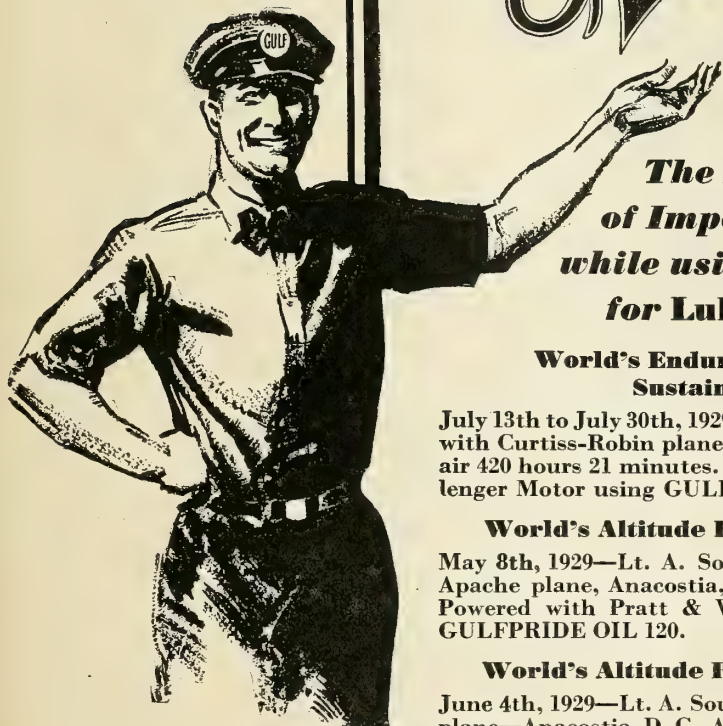
The new plane is an open biplane built for sport or training. It will seat three, the pilot in the rear cockpit and two passengers in the double cockpit ahead. It has a span of 31 feet, even wings, and weighs 1,250 pounds. All controls are enclosed, and improvements have been made in the ailerons to eliminate gap. The ship will be fitted with a new landing gear shock absorber.

The plane is the result of five years of experiments by Bischof. The new type of landing gear brake is a combination of oil air and spring action working in a hydraulic manner. The invention is new, and is designed for action on small training planes. Another improvement is a new adjustable stabilizer. This is a device that holds the stabilizer in place under all circumstances.

Mr. Bischof, who has over 100 students in his shop, was the founder of the Fort Worth Flying Club in 1924, when local enthusiasts met for the purpose of discussing the possibilities of aviation in Fort Worth, and its chances of becoming the air center of the South. Leading aviation enthusiasts at that time were Henry Woods, Seth Barwise, Bill Fuller, Mr. Bowen, and others now scattered throughout the country. The club took it upon themselves to strongly agitate for a municipal airport and when the club put over their objective, they disbanded to allow the Association of Commerce to carry on the fostering of air activity.



# Gulfpride Oil



***The Following Records  
of Importance were made  
while using GULFPRIDE OIL  
for Lubrication of Motors***

**World's Endurance Record for  
Sustained Flight**

July 13th to July 30th, 1929—F. O'Brine and D. Jackson with Curtiss-Robin plane "St. Louis Robin." Time in air 420 hours 21 minutes. Powered with Curtiss Challenger Motor using GULFPRIDE OIL 120.

**World's Altitude Record for Airplanes**

May 8th, 1929—Lt. A. Soucek, U. S. N. with Wright Apache plane, Anacostia, D. C. Altitude 39,140 feet. Powered with Pratt & Whitney Wasp motor using GULFPRIDE OIL 120.

**World's Altitude Record for Seaplanes**

June 4th, 1929—Lt. A. Soucek, U. S. N. Wright Apache plane—Anacostia, D. C. Altitude 38,560 feet. Powered with Pratt & Whitney Wasp motor using GULFPRIDE OIL 120.

**Curtiss Marine Trophy Race  
(For Seaplanes and Flying Boats)**

May 25th, 1929—Winner Lt. W. G. Tomlinson, U.S.N. With Curtiss Fighter—Anacostia, D. C. Average speed 162 miles per hour. Powered with Pratt & Whitney Wasp motor using GULFPRIDE OIL 120.

GULFPRIDE OILS are approved by leading Marine Engine Builders. Manufactured for Marine engine lubrication in five grades or body designations: Gulfpride Oil 75, Gulfpride Oil 100, Gulfpride Oil 120, Gulfpride Oil 150, Gulfpride Oil 200.

*Free sample vials and recommendations on request*

**GULF REFINING COMPANY**  
PITTSBURGH, PA., U. S. A.



## NEW YORK

**LIEUT. HARRY A. SUTTON**, a recent winner of the Distinguished Flying Cross and formerly of the United States Air Corps, has assumed his new duties as supervisor of technical equipment for the Aviation Corporation. Lieut. Sutton was awarded the Distinguished Flying Cross for his tests and experiments in spinning planes at Wright Field, Dayton, Ohio.

**THE Fidelity and Casualty Company of**

New York has entered the list of insurance companies comprising the Associated Aviation Underwriters. With the addition of the new company the Associated Aviation Underwriters has assets estimated at approximately \$4,000,000. Members of this group underwriting aviation risks are: Alliance Assurance; American of Newark, N. J.; American Eagle, Bankers' Indemnity, Continental, Federal, Fidelity-Phenix, Firemen's of Newark, Glens Falls Insurance, Glens Falls Indemnity, Hanover, London Assurance, Marine, Merchants of New York, Merchants Indemnity, Sea, Springfield, U. S. Guarantee, and Fidelity and Casualty of New York.

**CHESTER J. BILLS**, Chief of Police at Auburn, N. Y., has broadcast an appeal for information about Frank L. Irish, missing from his home in that city since July 30. He is an ex-service man interested in aviation and may be found around airports or aviation schools. He is 28 years of age, five feet 8 inches in height, and of fair complexion. His occupation is that of draftsman.

**EVENING** courses in meteorology, climatology and oceanography at Columbia University, New York City, are being offered to cover the needs of weather observers at airports, according to Vladimar P. De Smitt, instructor. Lectures and laboratory work in meteorology are given during the winter session.

This course includes modern methods of meteorology, the uses of instruments, construction of maps, weather forecasting and the application of such knowledge to weather control in industry, especially in the weather service of airports and airways. The course in oceanography includes a study of the geographical aspects and the geology of ocean waters. Lectures and laboratory work in climatology will be given during the spring session. This course is devoted to the study of the weather and climate, principles of weather forecasting and the value of the Weather Bureau. Mr. De Smitt was formerly a professor in the Russian Naval Academy at Petrograd.

**THE Edo Aircraft Corporation of College Point, L. I.**, has constructed an addition to its factory and doubled its floor space, which now totals 17,000 square feet, devoted entirely to pontoon construction. The entire Edo factory is connected by an overhead trolley system for the conveyance of pontoons from one part of the building to another.

A new anodic tank into which an entire



Winners of a recent model contest held in Central Park, New York City.

thirty-foot float can be dipped at one time has been constructed. A special spray with thirty nozzles is used to wash off the pontoons after they are dipped. The paint room has been constructed to maintain an even heat with good ventilation. A runway 250 feet long has been built so that seaplanes can be assembled in the factory and launched into Long Island Sound.

**AIR ASSOCIATES, INC.**, of New York has announced the formation of a subsidiary of the same name to take over the assets and operation of the New York corporation at its Chicago division located on the Chicago Municipal Airport. The subsidiary is incorporated under the laws of Delaware and licensed in Illinois with a paid in capital of \$5,000 and a surplus of \$95,000. The officers of the Chicago subsidiary of Air Associates, Inc., of New York are as follows: James B. Taylor, Jr., president; F. L. Hill, vice-president; and Haven B. Page, treasurer.

**THE Savoia-Marchetti S-55**, seaplane recently made a cross-country flight from the seaplane airport at Port Washington, L. I. to Los Angeles. Stops were scheduled at Buffalo, Cleveland, Detroit, Chicago, New Orleans, and other cities enroute in the southern and western states. Two pilots, two passengers and a mechanic made the trip. The Savoia-Marchetti S-55 is a twin-hulled monoplane, powered with two Isotta-Fraschini motors in tandem and accommodates two pilots and 14 passengers. It is manufactured by the American Aeronautical Corporation of New York, sponsors of the tour.

**DOUGLAS H. DAVIS** has been awarded the Barber and Baldwin Trophy for the most meritorious flying at the National Air Races. Flying the Travel-Air "mystery ship," Davis won the free-for-all race, breaking the world's record for speed over a closed course when he made 229.8 miles per hour on one lap of the race. Davis is divisional manager at Atlanta of Southern Air Transport.

**THE American Airports Corporation of** New York City has been retained by the city of Newburgh, N. Y., to design its air-

port and prepare cost estimates for the various stages of construction. The airport site, which was recently selected by the corporation's engineers, is four miles from the city on the main highway. Plans for the ultimate development of the airport call for an A-1-A rating.

**THERE** were 1,014 employees on the October payroll of the Sikorsky Aviation Corporation, according to a recent report of officials of the firm. The Sikorsky plants at College Point, L. I., and Bridgeport, Conn., are working on a production schedule of one plane every working day. In October, 1928, there were 225 employees on the Sikorsky payroll and the production was two ships per month. Sikorsky Aviation Corporation is a subsidiary of the United Aircraft and Transport Corporation.

### New York Glider Club Re-organized

**THE** New York Glider Club affiliated with the National Glider Association has been re-organized by its president, C. J. P. Germaine. The other officials of the club are A. B. Jerkyl, first vice president; C. S. Christopherson, second vice president; A. Kaptyn, secretary and treasurer; Prof. A. Klemm, technical advisor; and Robert Dewey, engineer. The club received its charter from the National Glider Association on October 19.

The club will construct its own gliders which will be chiefly of the seaplane glider type. Various types of seaplane gliders will be made for endurance purposes and training and passenger flights. The New York Glider Club will operate at the seaplane airport of the American Aeronautical Corporation at Manhasset Isle, Port Washington, L. I., through the courtesy of Mr. Bosi, president of the corporation.

Various methods will be used for the launching of the seaplane gliders. To train the members in gliding, a specially constructed hangar will be erected in which a training glider will be mounted on a swivel 10 to 15 feet high. Four airplane motors with propellers attached will set up air currents on which the prospective pilot will learn to ride. Seaplane gliders will be launched by towing behind a speed boat, and when competent the student will be put in tow behind a seaplane and released in mid-air to soar as he pleases. After the student member becomes a qualified glider pilot and seaplane glider pilot he will be given training in catapult launching. A special catapult will be constructed on a runway for this purpose.

The New York Glider Club is not a profit organization. Its purpose is to arouse enthusiasm in the glider sport and to assist young men to learn the principles of flying. It will form various groups to arouse competition and hold meets for superiority.

**STANDARDIZATION** of departments and additions to the management personnel of Air Associates, Inc., of New York at its principal service and equipment stations at Roosevelt Field and the Chicago Municipal Airport were announced recently

(Continued on next page)



# Wire or Write!

**G**REAT LAKES AIRCRAFT CORPORATION has developed a proven Operating-Sales Plan that now makes it possible for any capable individual or group to make money—*real money*—in the airplane business.

*This unique plan is built around—*

1. A line of ships of exceptional merit—approved by the Government—designed for the utmost in safety and efficiency—smart and saleable—up-to-the-minute in equipment—economical in operation—priced on a quantity-production basis.
2. A practical and effective plan of merchandising that insures profits both to distributor and dealer from the start—and also develops a lasting source of non-competitive business.
3. Constant and active co-operation of a highly capable sales promotion organization whose motto is: "*Sell ships by helping the distributor and dealer sell.*"
4. Distributors and dealers who are business men with selling ability, energy and reasonable working capital.

If you are earnestly seeking an opportunity to make money and establish yourself permanently in the airplane business, wire or write us today, outlining your sales or business experience and present connections.

*There is still some valuable territory available for the right type of men*

**Address: GREAT LAKES AIRCRAFT CORP.**  
**Sales Department: 230 Park Avenue, New York City**

**GREAT LAKES**  
C O R P O R A T I O N



**AIRCRAFT**  
C L E V E L A N D

C o n t r a c t o r s t o t h e U n i t e d S t a t e s A r m y a n d N a v y



(New York News continued)

by F. Leroy Hill, executive vice-president. Frederick W. Peel has been placed in charge of service at the Chicago division and Harold I. Crow has been appointed branch manager of the Roosevelt Field division.

#### Ground School Instructors' Courses at New York University

A COURSE for the training of instructors in aviation ground schools is being conducted by the School of Education of New York University in cooperation with the Daniel Guggenheim Fund Committee on Elementary and Secondary Education. The courses are designed to enable the student to pass the Department of Commerce examination for a ground school teacher's license.

The University is concentrating the course in eight weeks instead of extending it over an entire semester, in order to make it possible for flying schools to permit their personnel to attend. Classes meet five evenings each week. All of the members of the teaching staff hold Department of Commerce ratings. Special lectures by experts in various phases of the subject supplement the regular courses. The subjects included in the teachers' training course are airplanes, aircraft instruments, communication, air commerce regulations, administration and supervision of ground school instruction, airplane engines, meteorology and air navigation.

THE Bird plane powered with a 90-horsepower Kinner engine has been approved by the Department of Commerce. The Bird plane is manufactured by the Brunner-Winkle Aircraft Corporation of New York.

UNITED Aircraft Exports, Inc., has been appointed exclusive foreign sales agent for the Russell Lobe Parachute. United Aircraft Exports, Inc., is a subsidiary of United Aircraft and Transport Company.

THE Aero Supply Manufacturing Company, Inc., of College Point, L. I., has purchased an Aristocrat cabin monoplane fitted with display panels built into the fuselage for sales purposes. These panels

are provided with doors opening from the exterior of the plane and give access to display cases in which aircraft hardware manufactured by the company is carried and displayed. The plane is used to make trips to various airports in the East for the purpose of demonstrating and selling products of the Aero Supply company.

ROOSEVELT Aviation College has established in New York City a new ground school operated in conjunction with the ground and flying schools located at Roosevelt Field, L. I. Instruction at the New York ground school can be taken along with a course of flying instruction which is given at Mineola, or independently of flying instruction. Studies at the ground school in New York cover the same subjects as those given at the Long Island school.

THE Argo two-place sport and training plane recently made its first appearance at Roosevelt Field, Long Island, under the supervision of John H. Harmon, New York distributor of the planes. The Argo is powered by the 115-horsepower Hess-Warrior engine, and is one of the few planes in which both plane and engine were designed by the same engineer. The plane and engine are produced in the plant of the Alliance Aircraft Corporation of Alliance, Ohio.

Mr. Harmon has given stunting exhibitions in the plane at the field. With him is Lieut. Clanson-Kaas, formerly of the Royal Danish Flying Corps, who is eastern factory representative for the Alliance organization. Lieut. Clanson-Kaas is arranging distributorships throughout the east. In a recent demonstration he made two outside loops in the light ship.

CHANGES in the personnel organization and policies in sales and engineering research by the Curtiss-Wright Corporation have been announced by C. M. Keys, president. The Board of Directors of the combined organization have voted to change the name of Curtiss Flying Service to Curtiss-Wright Flying Service.

The following additional officers have been elected to the Board: J. A. B. Smith,

vice president, formerly secretary and treasurer of the Curtiss Aeroplane and Motor Company; Walter H. Beech, vice president, president of Travel Air Company; J. F. Prince, treasurer, treasurer of Wright Aeronautical Corporation.

Mr. Beech will be in charge of sales of all the manufacturing divisions of the Curtiss-Wright Corporation. Military sales, sales of engines and other branches of selling will remain directly under the control of the factory organizations. The separate manufacturing organizations, Wright, Curtiss, Keystone, Travel Air, Curtiss-Robertson and Moth will continue under their own separate organizations.

The Board of Directors announce that extensive aeronautical engineering research will be made under the supervision of Charles Lawrence, chairman of the technical committee. Steps will be taken to strengthen the engineering divisions working in military and commercial aviation.

A MEETING to discuss plans for the organization of licensed women pilots is scheduled at Curtiss Field, Valley Stream, L. I., on November 2. The meeting is sponsored by Neva Paris, Frances Harrell Margery Brown, and Fay Gillis.

MAJOR THOMAS G. LANPHIER has been appointed senior aeronautical engineer for Ford, Bacon and Davis, Inc., of New York, airport engineers. Major Lanphier, vice chairman of Transcontinental Air Transport, will continue his connection with Transcontinental, his affiliation with Ford, Bacon and Davis, Inc., being an independent enterprise.

#### CENTRAL NEW YORK

[MILDRED MARVIN]

GORDON K. HOOD, general manager of the Syracuse Branch of Curtiss Flying Service, announces the appointment of Lieut. H. I. Nevin as operations manager of the Syracuse Branch of Curtiss Flying Service. Lieut. Nevin has for the past several months been service manager of General Aviation Company, Inc., of Syracuse. As operations manager, he will be in charge of the local Curtiss operations. His office will be in the new Curtiss hangar which is being erected at the Amboy (Syracuse) field. Curtiss now has 14 airplanes at the Syracuse field.

Alden D. Wooster, chief mechanic of Curtiss Flying Service, Syracuse Branch, has the record of having kept 14 airplanes in the air for a total of 1,000 hours with but one forced landing, that being caused by failure of a broken contact spring in the magneto. Mr. Wooster was a Navy mechanic during the World War. He is licensed by the Department of Commerce both as a pilot and mechanic.

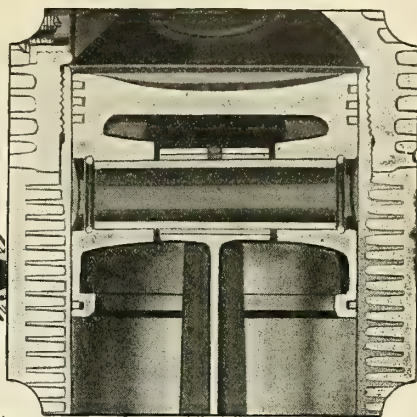
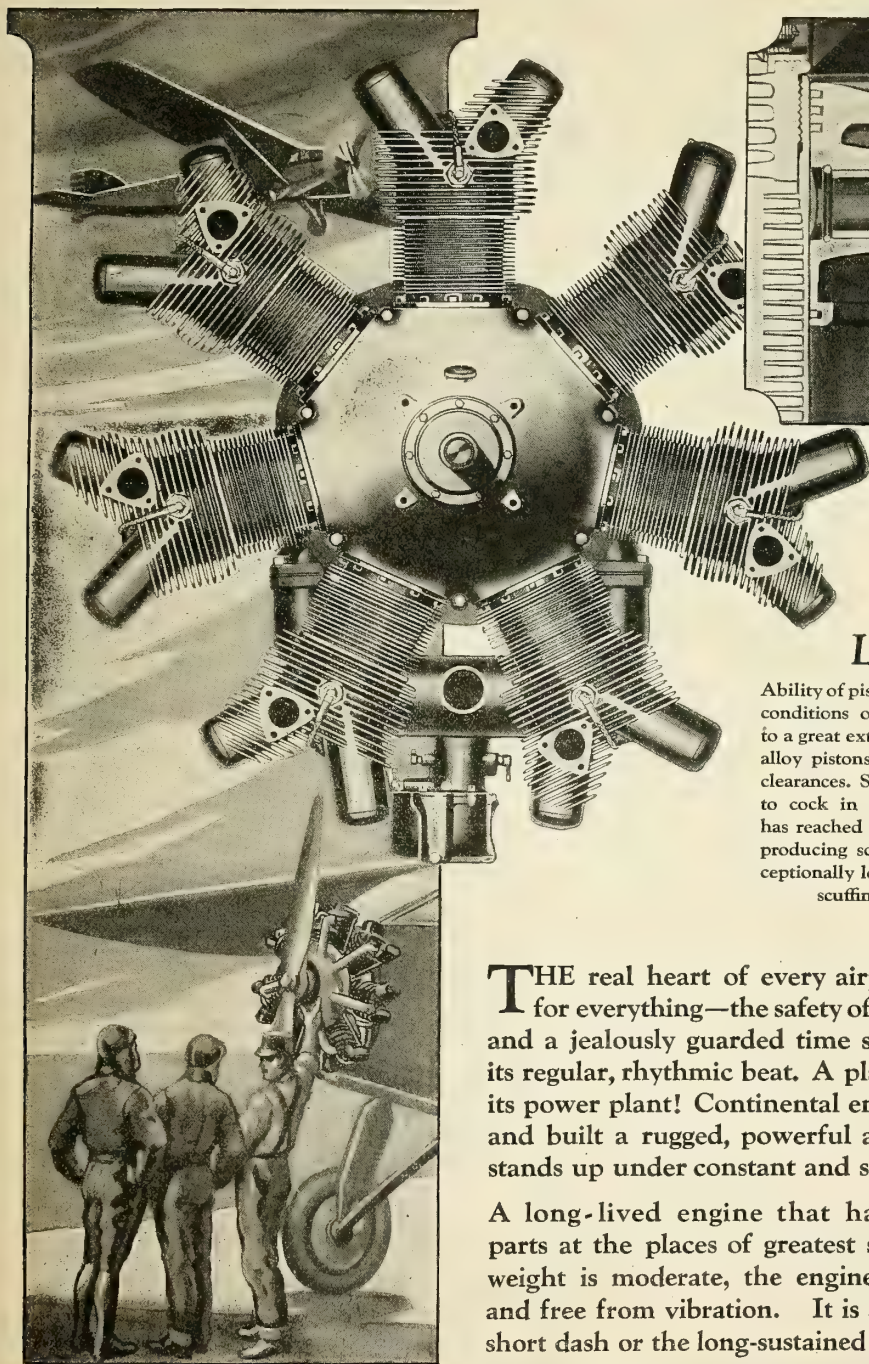
ROBERT C. HAYES, head of Hayes Aviation, Inc., which is developing 333 acres just north of the village of Cicero into an airport, is planning the immediate development of 333 additional acres at the field. There is a large club house at the airport to accommodate visiting pilots and passengers.

(Continued on next page)



Aristocrat sales plane of the Aero Supply Mfg. Co., showing display panels.





### Long Life

Ability of pistons to stand up under severe conditions of constant load determines to a great extent, engine life. Aluminum alloy pistons must be fitted with large clearances. Short pistons have a tendency to cock in cylinders before the engine has reached operating temperature, thus producing scuffing. Model A-70 has exceptionally long pistons which minimize scuffing and insure long life.

**T**HE real heart of every airplane is the engine, for everything—the safety of pilot and passengers and a jealously guarded time schedule depend on its regular, rhythmic beat. A plane is no better than its power plant! Continental engineers realized this and built a rugged, powerful airplane engine that stands up under constant and severe trials.

A long-lived engine that has large reinforced parts at the places of greatest strain. Yet the total weight is moderate, the engine perfectly balanced and free from vibration. It is always ready for the short dash or the long-sustained flight.

CONTINENTAL AIRCRAFT ENGINE CO.

Office and Factory: Detroit, Michigan



# Continental Engines



(New York News continued)

Work on the construction of a hangar has been started. The first unit will be 60 by 90 feet, with a lean-to. The hangar will be so constructed that similar units can be added across the entire field. By the summer of 1930 Hayes Airport will have runways of 4,300 feet in every direction, according to plans announced by Mr. Hayes. Mr. Hayes is the New York state distributor of American Eagle planes.

**A**NNOUNCEMENT was recently made of the election of Huntington B. Crouse, president of the Crouse-Hinds Company, as a director of Colonial Western Airways, Inc., a subsidiary of the Aviation Corporation and operator of the Albany-Cleveland air mail line.

**T**HE new hangar at the Amboy Syracuse Airport being constructed by the Syracuse Branch of Curtiss Flying Service, Inc., is expected to be finished this fall. It will be a two-story hangar 180 by 220 feet, costing about \$180,000. It will be modern in every respect providing conveniences for officials and students. It will include well-equipped class rooms, locker rooms and showers for men and women, lounge, waiting room, student headquarters, machine shops and offices.

**H**UGH BREWSTER, manager of Empire Air Transport, Inc., announces that a glider school is being formed by Empire Air Transport Company at the Amboy airport for glider students between the ages of 14 to 16 years.

## BUFFALO

**L**AURENCE D. BELL has been appointed general manager of the group of aeronautical interests of the Consolidated Aircraft Corporation of Buffalo, N. Y. Mr. Bell, formerly vice-president and general sales manager, succeeds Major R. H. Fleet, president, who has retired from active management. Ray P. Whitman, formerly assistant to the general manager, is assisting general manager.

**C**OMBINED orders totalling \$814,000 for Consolidated Husky trainers and spare parts have been received from the Navy Department and the Army Air Corps by the Consolidated Aircraft Corporation of

Buffalo, N. Y. The Navy Department ordered 71 standard military type Husky NY-1 landplanes, and 30 Husky NY-2 seaplanes, involving a purchase price of \$550,000. An order totalling \$250,000 for spare parts for Consolidated Husky trainers was received from the Air Corps. The Siamese Government also has given an order of \$7,000 for Husky trainer spare parts.

## Thomas-Morse Building Planes for Air Corps

**P**RODUCTION of 70 all-metal planes for the Army Air Corps has been started by the Thomas-Morse Aircraft Corporation, a division of Consolidated Aircraft Corporation. The planes were ordered from the company by the Air Corps at a purchase price involving approximately \$1,000,000.

The plane is known as the O-19-B and is constructed of duralumin and steel. It has a wing-span of forty feet and is equipped to carry a crew of two, three machine guns and 125 pounds of bombs which can be released through a special cockpit. It is powered with a Pratt and Whitney 475-horsepower Wasp engine, and has a high speed of 150 miles per hour and a cruising speed of 130 miles per hour. Gross weight is 3,900 pounds.

## NEW ENGLAND

[RUTH HUMMEL]

**T**HE Hartford Aviation Commission has constructed a new administration building at Hartford, Conn. The building is 89 feet by 210 feet and is constructed to permit an expansion to three times its present size. It houses the administration offices of Capt. Clarence M. Knox, State Aviation Commissioner, and his aides, and also contains the laboratory and office of Dr. William B. Smith, State Flight Surgeon, in addition to examination rooms, clerical space and waiting rooms. A school of aviation medicine for civilians is conducted on the premises under the direction of Dr. Smith and sponsored by the Department of Aeronautics of Connecticut.

**A** SURVEY of more than 150 airports and landing fields throughout the six New England States has been compiled by the Aviation Bureau of the Boston Chamber of Commerce. The survey was

based on questionnaires sent to 3,500 aeronautical organizations and individuals connected with the aviation industry. The questionnaire requested information concerning the ownership of the field, nature of the field, whether emergency or regular, location, area, and details as to runways, trees, wires or other obstructions. The survey was the first comprehensive study of landing facilities made in New England.

[EDWARD YANES]

**C**ONSTRUCTION and general development work on the new Boston airport is nearing completion, and boundary lights and a beacon have been installed. Pilots employed by private companies, and Army and National Guard flyers are using the field.

**K**IRBLY L. WHITSETT, pilot for Colonial Airways on the Boston-New York route, has resigned and accepted a position as pilot with the New York, Rio and Buenos Aires Airlines. Harold Christianson succeeds Mr. Whitsett.

**T**WENTY-FOUR air transport companies have been named authorized service and parts stations in the United States, Canada and the Panama Canal Zone by the Pratt & Whitney Aircraft Company, according to C. W. Deeds, sales manager. The service will be under the supervision of men trained in the Hartford, Conn. plant.

The following air transport companies have been selected to act as authorized parts and service dealers for Pratt and Whitney; Universal Aviation Corporation at Chicago, St. Louis, Kansas City and Wichita; Pan American Airways, Inc. at Brownsville, and Cristobal, Canal Zone; Maddux Air Lines, Inc. at Los Angeles and San Francisco; Southwest Air Fast Express, Inc. at Tulsa; Boeing Air Transport, Inc. at Omaha, Cheyenne, Salt Lake City, Reno, and Oakland; Pacific Air Transport, Inc. at Portland and Seattle; Aero Corp. of California, Inc. at Los Angeles and El Paso; Stout Air Services, Inc. at Detroit and Cleveland; Northwest Airways, Inc. at St. Paul; Pan American Airways, Inc. at Miami; Pratt & Whitney Aircraft Co. at Hartford; and the Canadian Pratt & Whitney Aircraft Co., Ltd. at Longueuil, Quebec.

[THOMAS F. BRESNAHAN]

**T**HE contract for clearing brush, timber and other obstructions from the 350 acres of land at Mills Grove, R. I., purchased by the State for a State-owned airport has been awarded to Martin F. Gaddis of Boston. The contract provides that the work be completed by the last day of the present year.

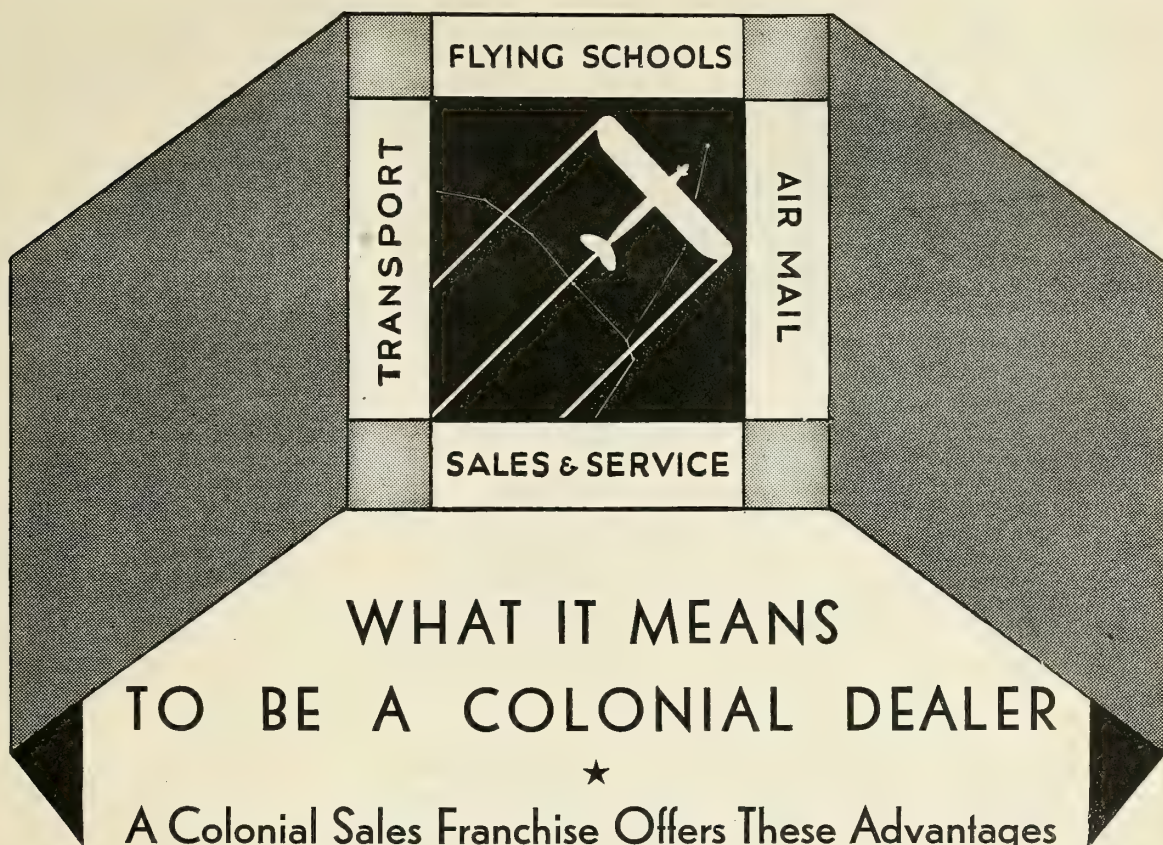
**N**ORTH and south runways at the What Cheer Airport, Pawtucket, the Rhode Island base for the Curtiss Flying Service, have been extended 600 feet as a result of the purchase of 30 acres of land by Nicholas Bertozzi, owner of the airport. Officials of the United Electric Railways, operators of

(Continued on next page)



Air marker on the roof of the Bullard Company plant at Bridgeport, Conn.





## WHAT IT MEANS TO BE A COLONIAL DEALER



A Colonial Sales Franchise Offers These Advantages

1 — A sales opportunity in the richest market for planes in the United States. . . . More than 931 planes are now licensed in New York State and New England, the area served by the Colonial System.

2 — A line of planes that fulfills all needs of the market as defined by (a) training schools and student fliers; (b) business organizations; (c) private owners; and (d) operators for charter service and passenger hopping. . . . The Colonial line of planes includes such famous names as FLEET, CHALLENGER, FAIRCHILD, PITCAIRN, STANDARD.

3 — Practical advice and suggestion based upon a successful operating experience in Air Mail and Air Transport. . . . Colonial experience in Air Mail dates back to 1926. Colonial

operation of the Air Transport with passenger lines running regularly from New York to Boston, New York to Montreal and Buffalo to Toronto, provides a standard for comparison.

4 — A chain of service stations throughout New York State and New England that is equal to any demands made by a dealer or his customers. . . . District sales offices are located at Boston, Buffalo, Hartford and Schenectady. Service facilities are also available at Newark, Albany, Utica, Rochester, Cleveland, Toronto and Montreal, Can.

For complete information as to territories available and conditions for securing a sales agency, write to Colonial Flying Service, Inc., 270 Madison Avenue, New York City.

# COLONIAL FLYING • SERVICE



DIVISION • OF • THE AVIATION • CORPORATION





The four-place cabin all-metal autogiro recently imported to this country from France by Señor Juan de la Cierva

(New England News continued)

the trolley and bus lines of the state have notified members of the What Cheer Airways, operators of the airport, that by spring transportation will be provided visitors to the field, which is located some distance from the trolley line.

## NEW JERSEY

OFFICIAL dedication of the Mercer Airport at Trenton, N. J., took place October 26, during ceremonies in which Morgan F. Larson, Governor of New Jersey, unveiled a tablet to General Mercer, for whom the field was named. Events in an air meet which was held throughout the day included: formation flights of military and civil planes over the airport and Trenton, a landing to mark contest, a five-mile commercial race for ships equipped with OX-5 engines, and a commercial race for ships powered with engines of a displacement not over 300 cubic inches.

Military races included a thirty-mile race over a five-mile course with a flying start by a group of bombing planes from Langley Field, and a forty-mile race around a ten-mile course for the John A. Roebling Eastern States National Guard Trophy. Special prizes were awarded to the first three winners. Demonstrations of various aircraft included those made by the Pitcairn Autogiro.

OFFICIAL adoption of new names designating the Wright Whirlwind J-6 series engines according to horsepower instead of the number of cylinders has been announced by the Wright Aeronautical Corporation of Paterson, N. J. The original names, "Whirlwind-Five", "Whirlwind-Seven" and "Whirlwind-Nine" have been replaced by the names, "Whirlwind 165", "Whirlwind 225" and Whirlwind 300".

GENERAL AVIATION COMPANY has been acquired by the Eastern Aeronautical Corporation which is located in headquarters at the Metropolitan Airport, Newark, N. J. The General Aviation Company operates airports at Syracuse, Geneva and Elmira, N. Y. The Eastern corporation specializes in the servicing, general overhauling and repair of airships and aircraft engines.

## PENNSYLVANIA

[RUSSELL GARD]

ONE of the first American-built autogiros successfully made its initial test flights recently at Hallowell Field, near Philadelphia. The new ship was flown by Juan de la Cierva.

The new autogiro, powered with a 300-horsepower geared Whirlwind engine, is equipped with a ten-foot propeller. With the exception of its size, the new machine is similar to the sport machine recently brought to this country by Cierva. It has the double tail surfaces and twin rudders of the smaller craft, although the addition of a middle vertical stabilizer has been made. The fuselage, a modification of the customary airplane design, is of the open cockpit type, accommodating two passengers in addition to the pilot.

The rotating vanes of the ship measure forty-three feet from tip to tip. A more substantial and stronger landing gear has been designed for the improved craft. The new American autogiro is nearly equal in size to the French machine recently imported by the Pitcairn interests. The foreign machine is a four-place, cabin, all-metal ship and has been entered in the Safe Aircraft Competition sponsored by the Daniel Guggenheim Fund for the Promotion of Aeronautics by the Cierva Autogiro Company, Ltd., of England. It is powered with Wright J-6, seven cylinder 225-horsepower geared engine. Constructed entirely of corrugated duralumin by the LePere Company of France under Cierva patents,

the autogiro has a fuselage of square monocoque construction.

Two other new production Pitcairn autogiros powered with Wright 225 horsepower engines, have been equipped with the new type landing gear, and are fitted with Goodyear Air Wheels.

THE Horton Plan for the development of Hog Island as a new municipal airport has been definitely approved by Mayor Mackey, of Philadelphia. The Mayor stated that the Hog Island port would not only meet the requirements of commercial aviation but would prove of great strategical value as a wartime base. An item of \$1,000,000 for construction work was included in a loan bill voted recently, but these funds will not be available until January.

The total area available at Hog Island comprises 1,369 acres, 239 of which are already owned by the city. The remainder will be leased from the United States Shipping Board, into whose hands the tract passed with the development of Hog Island as a plant for wartime shipping. The plan proposes that the waterfront be cleared immediately for the establishment of a temporary field for various air services, and, that as soon as the right to use adjacent property is established, construction be started on a three-way terminal—a single port combining air, rail and water transportation facilities.

## OHIO

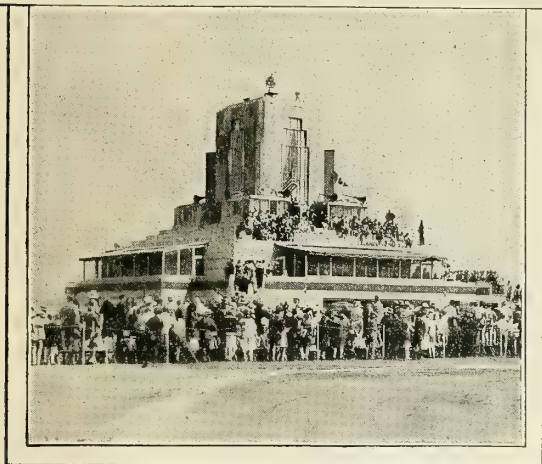
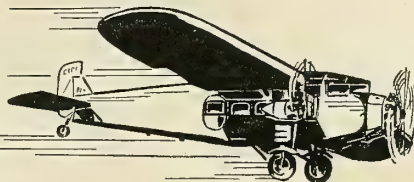
[T. E. LUNSFORD]

THE \$400,000 plant expansion program of the Ohio Seamless Tube Co., Shelby, Ohio, will be completed by Dec. 1, according to A. C. Morse, president of the company. New buildings and equipment will be in operation by Jan. 1, increasing the productive capacity of the company 40 per cent.

PURCHASE of two new Pitcairn Super Mailwing planes, establishment of a repair base at Pontiac, Mich., and appointment as distributor of Rusco Manufacturing Co. products for Ohio and Michigan, have been announced by the Thompson Aeronautical Corp. of Cleveland. The two Pitcairns will be put into mail service on the  
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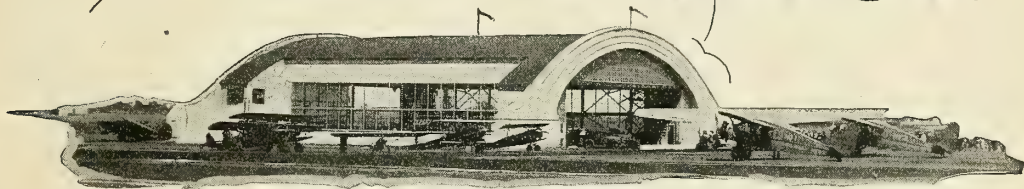


Fokker Super-Universal of the Goodyear Company fitted with air wheels



Club House, and Air Depot,  
Sky Harbor, Chicago

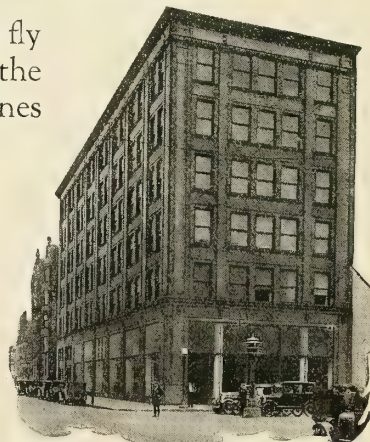
# FLY AT SKY HARBOR



Steel and Concrete Hangar, Sky Harbor, Chicago

**N**OW is the time to get into aviation—learn to fly at Sky Harbor, the finest flying field in the Middle West. Training on latest type training planes with air cooled motors similar to those used in the Army. Advanced training on Fokker and Trimotored Ford. We fly at Sky Harbor all winter.

Complete mechanic's courses covering every phase of aerodynamics taught at our big down town building—six floors of equipment—the finest ground school in the Middle West. Training given on latest types of motors, including whirlwind and other air cooled radials. Welding, navigation, meteorology, construction, and motors are included. Mail the coupon today for complete information. Be sure to investigate Sky Harbor before you pick your flying school.



Sky Harbor Flying School—Six Floors of Equipment

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<input type="checkbox"/> Transport Pilot's Course.	<input type="checkbox"/> Pilot's Course.
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<input type="checkbox"/> Mechanic's Course.	

NAME .....

ADDRESS .....

TOWN ..... STATE .....





The Crosley four-place cabin monoplane recently test-flown at Cincinnati

(Continued from preceding page)

company's Michigan lines. Increasing business in motor overhaul work at the Thompson hangar at Cleveland was given as the reason for opening a repair base at Pontiac to service the mail planes operated in Michigan. Ralph DeVore, who had charge of the Cleveland-Detroit amphibion passenger service prior to its discontinuance for the winter, will be superintendent in charge of the Pontiac shop. The Rusco products which the company will distribute are: Dartmouth-Tex fabrics, Rusco parachute shroud line, aero tape, safety belts, aero cord, luggage straps, battery covers and aero rings.

ESTIMATED net earnings of the Waco Aircraft Co., Troy, Ohio, for the third quarter of 1929 were \$83,000 after federal taxes were paid. For the six months ending June 30 earnings, after taxes, were \$138,000, and for the nine months \$221,000. This compares with earnings of \$229,000 for the entire year of 1928. Dividend requirements for the current year are \$145,000. Orders for the first week of October were for 20 planes, as against 21 planes for the entire month of October, 1928.

THE Great Lakes Aircraft Corp. has received a contract to construct 50 main floats for use of Vought-02-U observation planes and 90 sets of small wing-tip floats with accessories for the United States Navy. The equipment is to be completed within 90 days.

ERECTION of enclosures within which spectators at Port Columbus are requested to stand while the T. A. T. passenger planes are landing at the airport will obviate the necessity of permanently employing men to act as special police at the Columbus, Ohio, airport according to an announcement by Service Director Duffy. Under the present arrangements the spectators are warned by means of the loud speakers at the administration building to withdraw from the landing field to the enclosures.

THE Alliance Aircraft Corporation of Alliance, Ohio, voted to increase the capital stock of the company from \$300,000 to \$500,000 at a recent meeting of company officials. The future business outlook of the Alliance firm is favorable, according to W. E. Trump, president of the company.

THE test flight of an experimental high-wing, four-passenger cabin monoplane, developed by Powel Crosley, Jr., president of the Crosley Radio Corporation, was recently made at Cincinnati. The plane is powered with a Wright Whirlwind 165, and has a cruising speed of 100 miles an hour. High speed is 125 miles per hour. It has a forty-foot wingspan and is twenty-six feet overall. Rusel O. Wiest piloted the plane on its test flight. Another experimental ship constructed by the Crosley company has been in the air for several months. It is a high-wing open monoplane.

## CLEVELAND

### Profits of National Air Races

PROFITS of approximately \$100,000 are held by the National Air Race and Show Corporation and National Air Races, Inc., for the promotion of aviation in the Cleveland district as a result of the recent 1929 National Air Races and aero exhibition, according to an announcement by W. Henderson, managing director, following a financial statement by Ernst & Ernst, auditors. The report shows a net profit of \$96,691.57, with all bills paid or allowed for, and a reserve for contingencies of \$4,000 which had been set aside. These profits may be reduced by \$12,000 if the U. S. Treasury Department decides to impose a tax.

Gross income from tickets, show space, programs and other concessions, amounted to \$603,268.89 while total expenses of \$501,998.30 were made up as follows: building

construction, including grandstand and rent, \$156,762.29; general and administration, \$138,148.42; contests and prizes, \$121,156.39; publicity and advertising, \$43,385.50 and field personnel and preparation, \$42,545.70.

About \$50,000 of the expenses were put into improvements at the Municipal Airport; city funds purchased the additional land and provided other improvements. The total paid admissions fell below the estimated 450,000 by 160,000. The actual total was 205,000 at the races and 77,000 at the exposition. Underwriters were called on for only \$2,900, the amount required to qualify them as race directors.

When arrangements were being made for this year's classic, it was announced that all profits would be used for the promotion of aeronautics in Cleveland. A number of suggestions toward this end are now being considered by the board.

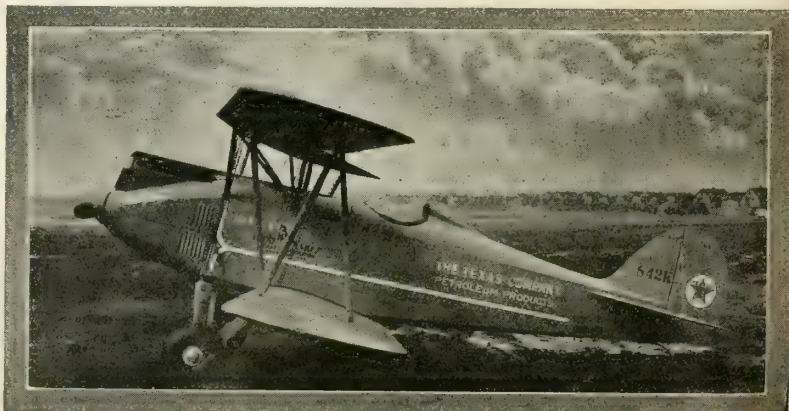
It is not unlikely that the \$96,691 will be used as a basis for holding the 1930 Gordon Bennett International Balloon race in Cleveland. An official bid for this race is to be presented soon to the National Aeronautic Association, following the adoption of a resolution by the aviation committee of the Chamber of Commerce. It has the indorsement of city officials and aeronautical leaders.

PHILIP SHUMWAY, formerly associated with the Braniff Air Lines, has become head of traffic and public relations of the Continental division of the Universal Air Lines, with headquarters in Cleveland.

Work is rapidly progressing on the new hangar of the Universal lines, adjacent to the terminal on the Cleveland Municipal Airport. The building, to cost about \$80,000, will be a one-story structure, 104 by 143 feet, and will be used for school purposes. It is the thirteenth to be erected on the local field and is one of four projected.

A GREAT LAKES SPORT TRAINER has recently been added to the fleet of the Texas Oil Company for use by Lawrence Cooper who will cover Pacific Coast territory for the oil firm. The ship is standard in all respects except that the front cockpit has been covered over to form a

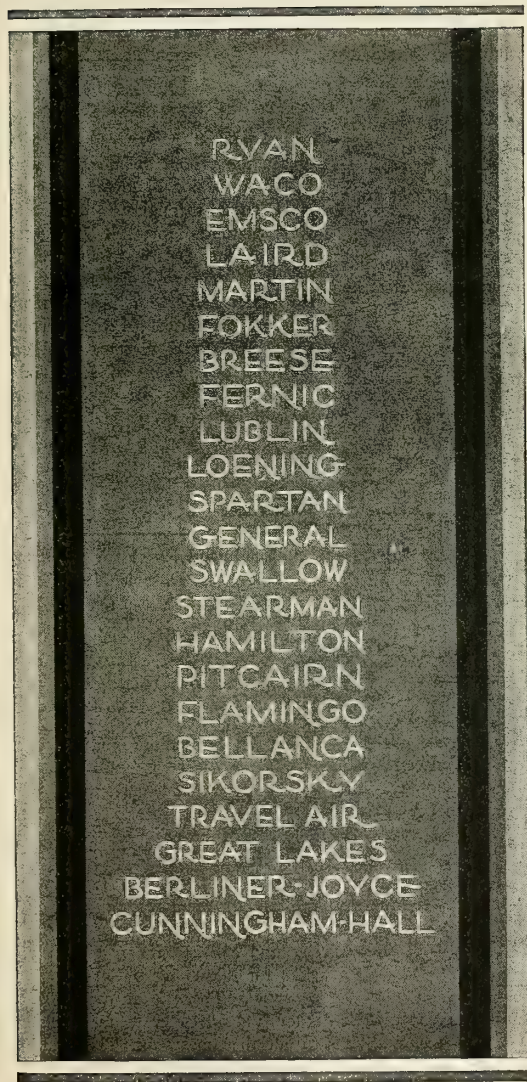
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Special Great Lakes Trainer recently purchased by the Texas Company for use in its Pacific Coast territory. Note that it is equipped with the new type air wheels



# RECOGNITION



NO more convincing recognition could be accorded Aerol Landing Struts than their use as standard equipment by such manufacturers as these. It gives the oleopneumatic principle of absorbing landing shock definite supremacy.

The fact that 23 manufacturers have standardized (and that practically all others offer Aerol Struts as optional equipment) makes it possible for the entire operating end of the aircraft industry to enjoy a degree of landing comfort, safety and economy *that is not afforded by any other type of landing gear.*

Aerol Struts are manufactured at Cleveland by the Cleveland Pneumatic Tool Company.

ASK THE PILOTS WHO LAND ON THEM

**AEROL** *shock absorbing* **STRUT**



(Ohio News continued)

baggage compartment and it is equipped with new Goodyear Air Wheels. The paint job is special, being bright Texaco red with a white stripe and the emblem of the company on the rudder in red, white and green.

THE purchase of an airplane and the establishment of a department to specialize in the writing of all kinds of aviation insurance, have been announced by Davis & Farley, Inc., of Cleveland. The head of this department and the chief pilot will be Lawrence A. Walker, former lieutenant and instructor in the United States Army Air Corps. Ken Davis, president of the company, will also fly the company plane.

WITH the closing for the winter of the amphibion trans-lake passenger service between Cleveland and Detroit by the Thompson Aeronautical Corp., Tex Marshal, general manager, has announced plans for expansion of the line next year. Eight planes daily except Sunday will be flown on an hourly basis, it is announced, in the belief that increased service will bring greater volume of business. A four-trip daily service from each city was operated this year using Loening amphibions.

## COLUMBUS

[W. DONALD WALTER]

THE War Department has accepted the resignation of Lieutenant Frank M. McKee, Air Corps, formerly commanding officer of Norton Field. Lieut. McKee becomes the manager of the Columbus branch of Curtiss Flying Service, Inc. Lieut. McKee, rated as a balloon pilot, an airship pilot, and an airplane pilot, came to Columbus from Scott Field about three years ago. In addition to his Air Corps duties, he has, since that time, served as vice president of the Aero Club of Columbus, and as a member of the Airport Commission. He also organized the Junior Aero Club, which has done much to promote air-mindedness among the boys of school age.

LIEUTENANT McCONNELL at Norton Field has hung a chart on one wall of his office showing the time flown during the present fiscal year by all officers attached to the field. The chart is blocked off into squares, each of which denotes a certain number of minutes flying time. Each officer is assigned a line across the chart, and his time is shown by crayon marks in the proper number of squares. The result is a very graphic flight report.

A MINIATURE Curtiss-Robin, with a wing-spread of about two feet, is to be used by the Curtiss school at Port Columbus in training students. This model is mounted on a table, and is attached with a universal joint to a vertical length of light tubing. In front of the table is a wind tunnel, four or five feet in diameter and six or eight feet long. Air is forced through this tunnel by a metal propeller driven by an electric motor. The rheostat governing the speed of the motor and the volume of air is controlled by a lever mounted in a manner similar to the throttle mounting in an air-

plane. The student sits behind the ship, with a full set of controls. These controls are connected to the control surfaces of the model by cords through the tubing on which the model is mounted. By correct manipulation of the throttle, stick and rudder the model can be made to take off and land; turns and banks almost up to the vertical can be executed.

## MICHIGAN

[KARL F. ZEISLER]

### Official Aeronautic Activities in Michigan

INSPECTION of flying schools in Michigan for the purpose of issuing state licenses is under way by the state aviation commission. Temporary licenses are now in effect pending the inspection. Efforts of the commission to establish a central state airport has been refused by the state administrative board. Ray Collins, Detroit, manager of the 1929 Ford Air Tour, has been named state director of aeronautics by the commission.

Governor Fred M. Green has issued a proclamation urging Michigan communities to erect markers for the guidance of aviators. The governor requested towns not only to paint their names in conspicuous places, but to provide for the illumination of the markers for night flying. Several towns have already complied, the work being done by local service clubs.

H. F. Rough, with offices in Detroit, has been named supervising inspector for the fourth aircraft inspection district, including Michigan, Ohio, Indiana and Kentucky, by the Department of Commerce.

MUSKEGON County this year combined its county fair with a free air show, and met with such success that the fair directors will follow the practice in the future. Events were held over the county airport, drawing a crowd of 50,000. The county will spend \$75,000 on the improvement of the 275-acre flying field; contracts have been let and construction is under way on a hangar for the field to cost over \$14,000. The building will be 79 by 102 feet with a 14-foot clearance. Lighting equipment is expected to be installed before winter.

[ROLLIN FAIRBANKS]

THE Flo Flying Services, Inc., operating from the Ann Arbor Municipal Airport, has been busy since Michigan State University opened this fall. A Stinson Senior and two Spartan biplanes powered with Siemens-Halske motors have been sold by the firm.

The north-south runway at the Ann Arbor airport is being filled in with gravel preparatory to oiling, and when completed, it will be about 3,500 feet long. The east-west gravel runway was recently oiled. Through arrangements made between the American Railway Express and the Thompson Aeronautical Corporation, express may now be shipped by air from Ann Arbor.

The gliding unit of the University of Michigan Aeronautical Society has been presented with a primary training glider built

by Gliders, Inc. Several new members have been secured, thus raising the total enrollment to 100. Gliding is now being carried on every afternoon during the week and all day during the week ends. Five members have already secured their third class pilot's licenses.

A 400-ACRE airport and a two-story factory building 80 by 130 feet, affording approximately 25,000 square feet of floor space are included in the building project of the Dare Aeroplane Company, formerly of Detroit and now of Milan, Mich.

## DETROIT

THE National Glider Association has launched a national campaign to increase the present membership and to assist in the formation of glider clubs in the principal cities throughout the United States. Karl S. Betts, formerly membership secretary of the Detroit Board of Commerce, has been appointed director of publicity by the glider association. As chairman of the aviation committee of the Detroit Aircraft Club, Mr. Betts directed publicity for the National Air Tours of 1927 and 1928.

The expansion of the National Glider Association is being made in response to an increased interest in motorless flying, and thousands of inquiries have been received at the Detroit headquarters of the glider association.

### Lockheed Plane for Reporters on Detroit News

THE Detroit News has purchased a specially-built Lockheed Vega from the Lockheed Aircraft Company of Los Angeles. The plane has been christened *The Detroit News* and will be used in transporting reporters and photographers to the scenes of important happenings and to cover aviation events.

The passenger compartment of the plane is equipped with special openings for making aerial photographs and can be used as a dark room to develop pictures while the plane is in flight. A typewriter desk for the use of reporters en route is also provided. The plane is equipped for night flying and can be equipped with pontoons or skis for taking off or landing on the water or snow. There is an extra air speed indicator and altimeter to facilitate the making of aerial photographs. The plane is powered by a Wasp 425-horsepower engine.

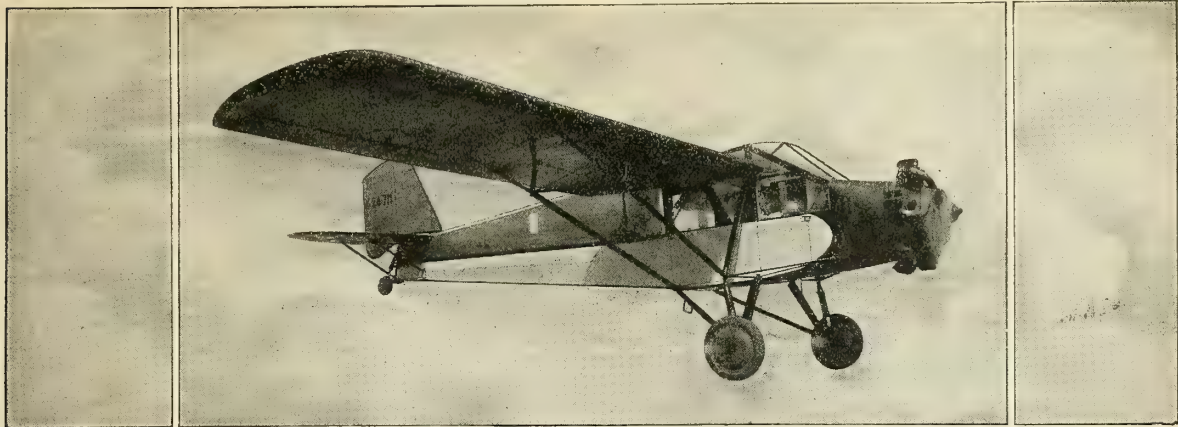
## INDIANA

[RUTH NUSSBAUM]

THE success of the first annual Indiana good-will air tour, Sept. 16 to 21, sponsored by the Indiana Aircraft Trade Association, in which thirty-four planes visited twenty cities, has resulted in plans being started for a larger tour next year. Many of the cities visited had only emergency landing fields, but the tour created enthusiasm in these cities for improved airports.

The tour was arranged by Tour Manager William F. Sturm and Herbert O. Fisher. Lieutenant M. G. Carpenter, of the

(Continued on next page)



# THE NEW B/J--The First Full Vision Plane

**N**OW—an enclosed plane without a blind spot. The B/J engineering staff, drawn together for the pioneering of new designs for military planes, has carried this same original designing into a two-place tandem monoplane for commercial, private or training use.

The result is that the first commercial B/J embodies a new wing arrangement that affords full vision in all directions.

Seated at the controls of the new B/J, the pilot commands a full, clear view . . . overhead . . . above and below the wing on either side . . . and to the rear. By a movement of the eye or turn of the head he views the entire cyclorama of land and sky.

The ample side windows, of shatter-proof glass, may be opened or closed at will.

Combined with this unique full vision design are remarkable stability, easy yet positive controls, and numerous other features which make the B/J especially suited for student training or private flying.

The advanced design of control surfaces and gear afford a degree of maneuverability and control comparable to that of military aircraft. High

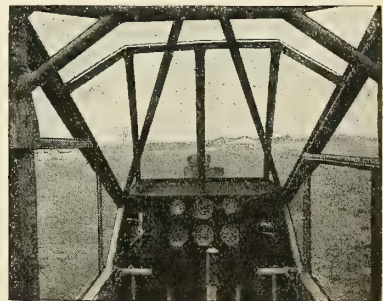
cruising speed, ample fuel capacity and relatively small fuel consumption result in a wide cruising range. A high angle of climb, slow landing speed and wheel brakes make the plane well adapted for small field operations and for private use.

Setting new standards in ease of handling and in safe, comfortable, care-free flying, the B/J is a "Pacemaker of the Air" in salability as well as in performance. Write for further information about this new B/J, and about distributor territories still open.



A view inside the comfortable, roomy cabin of the new B/J, showing the all-window construction which begins at a level with the pilot's waist and extends above the wing, back beyond the rear seat and across the top.

The pilot of the new B/J has only to move his eyes or turn his head to command a full, clear view in all directions—overhead, above or below the wing on either side, or to the rear.



Taking off or landing, a broad, clear view of both land and sky spreads before the pilot of the new B/J. Equipment includes clock, compass, tachometer, air speed indicator, altimeter, oil pressure, temperature and gasoline gauges.

**BERLINER JOYCE AIRCRAFT CORP.**  
BALTIMORE MARYLAND  
"PACEMAKERS OF THE AIR"



(Indiana News continued)

Indiana National Guard, was tour master, assisted by James F. Frenzel.

Cities visited were: Newcastle, Connersville, Union City, Richmond, Muncie, Anderson, Kokomo, Fort Wayne, Peru, Plymouth, Goshen, Elkhart, Gary, Lafayette, Greencastle, Terre Haute, Princeton, Boonville, Evansville and Bedford. The tour started from Hoosier Airport, Indianapolis, and ended at Capitol Airport, Indianapolis.

**F**UNDS for leasing a municipal airport have been included in the 1930 budget by the Newcastle city council. Twenty-eight young men and women at Newcastle have been enrolled in the Rose City Aero Club, organized by Ogle Meeks to provide student training.

Mayor Strod Hays of Newcastle, Ind., has named Arthur B. Ayres, Maurice C. Goodwin and Dr. W. C. Goodwin on the Newcastle municipal airport commission. They have been instructed to view a number of proposed airport sites and obtain options for the establishment of a proposed airfield.

**D**RAINAGE of the new Indianapolis \$695,000 municipal airport of 1,000 acres is under way and plans for establishing 2,500 foot paved runways are progressing. The airport probably will not be opened for use until next spring, City Engineer A. H. Moore has stated.

## ILLINOIS

[MRS. EDITH TILTON]

### Moline Association of Commerce Secures Vote for Airport

**A**T a special election, Moline, Illinois, voted an appropriation of \$250,000 to buy and improve a municipal airport. The Moline Association of Commerce was active in accomplishing this project for the city.

The aviation committee of the Association has had the project in mind for more than a year, but as the city council had made no arrangements to finance the election, the committee laid plans to submit the question of a municipal airport to the people. Such an election would cost about \$3,000. Twenty-eight property owners were interviewed and agreed to permit their property to be used gratis as polling places. Election officials to the number of 140 agreed to serve without pay. A committee went before the council asking that a special election be called, reporting the offers of free services of officials and polling places. The Association of Commerce volunteered to assume the cost of printing ballots and attendant expenses. The council responded with a call for an election to assess a two mill tax levy for an airport. On election day 100 additional workers and 55 automobiles assisted in getting out the vote. The project carried by a three to one majority.

The first week in September condemnation proceedings were instituted to acquire 330 acres of land for the airport. This acreage will include the 100 acres now in use as an airport and 230 acres more. The

estimated cost of the land is \$100,000. This will leave approximately \$150,000 for permanent improvements on the field.

Moline is the contact point between Chicago and Kansas City of the National Air Transport, contract air mail carriers between Chicago and Dallas. Curtiss Flying Service, which has cooperated with the local Association of Commerce in their plans for a better airport, has announced that when Moline acquires the municipal field, the Service will spend \$100,000 on additional building improvements.

**P**EORIA, Illinois, is to have a new airport of 126 acres with a possible expansion to 160 acres. The new site is located three and one-half miles from the business section and one-half mile from the city limits. The 160 acre tract, part of which is now under development, is located at the northwest corner of the city and adjoins another 160 acre tract belonging to the Park Board.

The firm of E. B. Cole, Inc., local operators and distributors for Eaglerock and Fairchild planes, have acquired the lease on this property and are proceeding with developments. The Austin Company of Cleveland, Ohio, have been retained by the local concern and have started preliminary work on the project.

Two runways will be laid and the entire field will be put into condition for all-weather use. Besides grading and necessary tiling it is planned to construct a brick and steel hangar with concrete floor that will house from fifteen to twenty planes.

**T**HE Bloxham Aero Supply Company of Chicago has formed a department for forming and welding airplane parts. The factory has closed several contracts with airplane manufacturers.

## WISCONSIN

[WILLIAM SCOLLARD]

**W**AUSAU, WISC., is preparing to raise funds with which to construct an electric beacon on Rib mountain, the highest point in Wisconsin, in memory of Maj. John P. Wood. The steel tower of the beacon will rise 60 feet above the peak of the hill. It will contain two lights, throwing beams in opposite directions and will revolve continuously at night. The lights will be of about 8,000,000 candle power each and will be visible 75 to 100 miles.

**Y**OUNG radiators, made by the Young Radiator Company of Racine, Wisc., are now equipped with recirculating boxes for use in airplane factories, hangars and workshops. These radiators are used for heating and for the forced drying of paints the dopes. They can be obtained in various sizes, and, without the recirculating device, can be used for overhead installation.

**A** NEW engine test stand just completed by the Comet Engine Corporation at Madison, Wisconsin, incorporates two unusual features: it measures the engine's thrust, and the control room is built above

the engine mount. The stand was developed under the direction of John H. Geisse, vice president of the firm in charge of engineering.

With the overhead control room, fuel and oil tanks can be placed on scales on the floor. The hookup of the engine controls is direct and the connection between the torque arm and the torque scale is direct.

Instruments record the following information: revolution per minute, engine torque, rate of oil consumption, rate of fuel consumption, rate of oil flow, oil in and out temperature, oil pressure, cylinder temperatures, air speed, air temperature, barometer, manifold vacuum, and engine thrust.

## MISSOURI

### Barling NB-3 Approved with Velie and Genet Engines

**A**PPROVED Type Certificates number 230 and 231 for the Velie and Genet-powered models of the Barling NB-3 Monoplane recently introduced by the Nicholas-Beazley Airplane Co., Inc., of Marshall, Mo., have been issued by the Department of Commerce. The Genet engine weighs 215 pounds and is rated at 80 horsepower. Production is going forward at the rate of one plane per day with the output being divided equally between the three models powered by LeBlond, Velie and Genet engines. All planes are equipped with a standard motor mount which is adaptable to all three engines.

The appointment of Dungan Airways, Inc., of Cleveland, Ohio, as distributors in Ohio for the Barling NB-3 Monoplane has been announced by the Nicholas-Beazley Airplane Co., Inc. An initial order for twelve planes was placed by the Cleveland concern, which operates at the Cleveland Airport. The Weiant Aircraft Sales Co., of Newark, Ohio, has been appointed dealer for the NB-3 plane.

**L**AMBERT AIRCRAFT CORPORATION, a subsidiary of Allied Aviation Industries, Inc., has received an order from the Nicholas-Beazley Airplane Company, Inc., calling for the shipment of two Lambert engines weekly until further notice. The Nicholas-Beazley company manufactures the Barling NB-3 light monoplane.

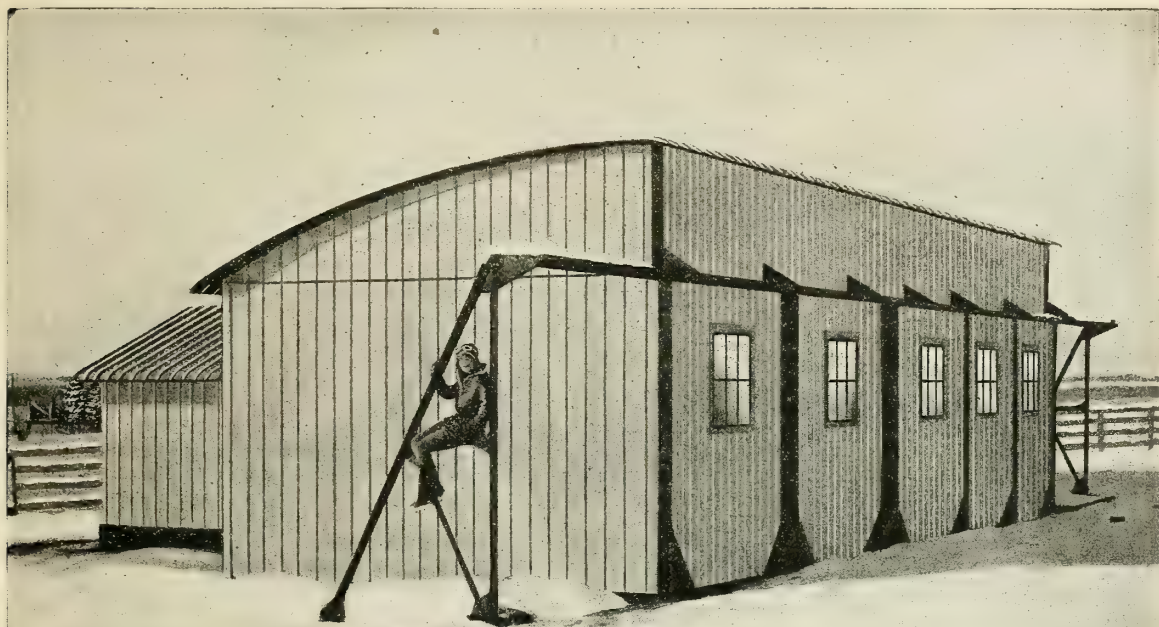
## ST. LOUIS

[A. W. LEAGUE]

### Additions to the Curtiss-Robertson Plant

**T**HE addition of a new assembly building and dope plant, and the installation of several of the latest milling and stamping machines, has been completed at the Curtiss-Robertson Airplane Manufacturing Company plant at the St. Louis Municipal Airport. With the addition of milling and stamping machines and a heat-treating process the wing spars and other metal parts previously manufactured at the Curtiss plant at Buffalo, New York, are now made in the St. Louis plant. The new assembly building has an area equal to that of the original plant and is required to handle the production of the

(Continued on next page)



# WINTER QUARTERS FOR THE PRIVATE SHIP

**W**INTER will soon be sending its heavy skies, its snow, ice and sleet to clip the wings of aviation. Most days will be ground days for the private ship.

Before winter comes, there is still time to provide winter quarters — protection against the elements, against fire, against tampering.

Butler Hangars are ready-made of prime quality steel shaped to secure the greatest strength per pound. Every unit is formed to template and matched punching facilitates bolting accurately in position. Erection is so simple and easy that one man can do it.



Butler Individual Ready-made Hangars are made in sizes suitable for all ships and with round or gable roofs. The Butler 3-in-one hangar also has a

garage and a work room in connection.

A new booklet pictures installations of Butler individual and commercial airport hangars. Butler engineering service will supply full information and prices if you will mention the size building in mind.

## BUTLER

READY-MADE  
HANGARS

**BUTLER MANUFACTURING COMPANY**

1234 Eastern Ave.  
Kansas City, Mo.

934 Sixth Ave., S. E.  
Minneapolis, Minn.





(Missouri News continued)

Curtiss Thrush, six-place cabin monoplane.

The Thrush fuselage has riveted joints; the first one was turned out the latter part of September. The production schedule for the new plane has not been completed, but it is expected that it will equal that of Robin planes, which are turned out at the rate of 18 a week. Among the first Thrush planes turned out at the local plant will be 12 ships designated for air mail and passenger service in China.

A new office building at the Curtiss-Robertson factory is under construction and will be ready for occupancy in November.

#### Von Hoffmann School Approved

THE Von Hoffmann Aircraft Corporation at the St. Louis Municipal Airport has been approved as a transport, limited commercial and private pilot school by the Department of Commerce. The Von Hoffmann school has grown from one hangar and three planes to a nationally recognized training school with equipment which permits instruction on eight different types of planes. One of the recent types to be included is a Whittlesey Avian. In addition to three modern brick and steel constructed hangars, the school has two student homes. Because of an unusually large enrollment the Von Hoffmann Company is constructing an addition to its student barracks. The building, which has accommodations for 60 students, is a one-story structure and will be finished in cream colored stucco.

A new hangar has just been completed for the Von Hoffmann Aircraft Co. This building is of brick and steel construction and the first unit measures 100 by 120 feet. The total structure will, when completed, comprise two main hangars, one of the size above noted, and, in addition, a 40-foot lean-to connecting to a second hangar which will have a span of 120 feet.

In the lean-to will be located a waiting room, general offices, private offices for airlines and on the second floor, a mezzanine lounge, retiring room, offices for the pilots, etc.

## AMERICAN EAGLE GOODWILL TOUR

By Erle H. Smith

JUST where in these United States does one have to go to find the greatest degree of air-mindedness? If the answer to this question were left to the American Eagle Goodwill fliers, the reply would be the smaller communities.

Having covered virtually a third of the United States at the time this is written, and having flown a distance of more than 7,500 miles, the American Eagle Goodwill Tourists are in a fair position to judge the attitude of the public toward aviation.

"By all means, the smaller communities," said E. E. Porterfield, Jr., president of American Eagle, when asked his opinion. "We have found larger crowds at the airports in the smaller cities and far more intelligent ones in things aeronautical."

"The larger cities seem to have taken the attitude: Here's our airport; come in use it any old time. A great many of the large city airports are trailing in the rear rank as to quality, not only of airport, but of service as well."

"I believe New York state leads in the quality of small community airports, with Ohio, Indiana and Michigan running a close race for second honor."

"This condition is, of course, the natural outcome of the growth of air-mindedness in the community. Perhaps, those in the smaller cities have more time for such matters. At any rate they are doing a wonderful job of it and one which is bound to react favorably to themselves and the aeronautical industry as well."

The tour, which is sponsored by the American Eagle Aircraft Corporation, Fairfax Airport, Kansas City, Kans., consists of six airplanes of the various types the company builds. It is scheduled to visit all American Eagle dealers and virtually every major airport in the United States.

One of the purposes of the tour is to obtain operations data on the planes and the

several types of engines with which they are powered. Representatives of the engineering department of American Eagle, as well as of companies manufacturing the engines, are accompanying the tour.

The layman is beginning to formulate his own ideas about aircraft. He is beginning to develop preferences as to features of planes, engines, etc. He knows the various instruments and has better than a sketchy idea as to their importance and purpose.

The layman has figured out in his own mind the reasons for the various designs in airplanes—he knows about dihedral, sweep-back, stagger, and various aerodynamic principles. He even recognizes an unusual wing curve; the unusualness of a clip wing racer; the neatness of a brake installation; the compactness of a pilot's cockpit and the roominess of the passenger compartment.

All of these and many other developments have been revealed to the American Eagle Goodwill Tourists as they fly from airport to airport and talk with fliers, non-fliers and just plain ordinary air-minded folk who regularly gather in great numbers at airports everywhere in the United States.

Mr. Porterfield says the tour has convinced him more than ever before that the private owner field in aircraft sales has not been scratched by the airplane salesman.

"Many places on the tour, I found men of means and men who really can use aircraft in the conduct of their business, loitering around air fields like youngsters standing in front of toy shop windows, hoping that in some way they can get in actual contact with flying. They are learning all about airplanes now, and when they begin buying, will have their minds fairly definitely made up as to what they want."

The goodwill tourists will complete their swing around the United States with a flight north along the Pacific Coast and back to Kansas City by way of the Northwest.



Scenes during the American Eagle Goodwill Tour. Top: E. E. Porterfield, sponsor of the Tour, and reception of the Tour at New Philadelphia, O. Bottom: the Tour at North Adams, Mass., and four representatives of the American Eagle Company: H. S. Lowe, J. E. Bowen, Charles Blossom and Erle H. Smith



# A VIATION



## DEMANDS MORE TRAINED MEN



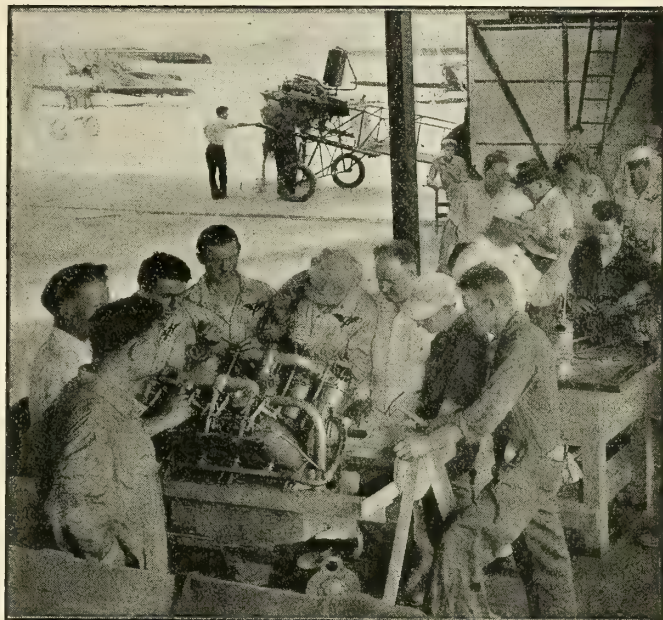
### PARKS *training* *will assure your* *success* « « « «

**RIGHT** now—today—there are literally thousands of unfilled jobs—big-paying jobs, too—in the fascinating aviation industry, awaiting *men with the right training!*

The supply of skilled, thoroughly trained airplane and engine mechanics is pitifully smaller than the demand. Here's opportunity for you. Here's a ready-made chance to step into the most profitable and attractive type of job.

But—you must be trained before you "cash in." Your success will depend directly upon the *kind and thoroughness* of your training. Parks Air College (the largest civilian aviation school in the world) is better equipped than any other institution to give you exactly the training you need.

Every instructor at Parks is a *seasoned practical expert*, licensed by the United States Government, and *sincere and conscientious* in his desire to give you *complete, painstaking instruction* in everything you need know! The equipment at Parks is the best and most modern of its kind. Here you will obtain practical working knowledge of the famous engines and planes of the world. You will learn how to build and repair planes.



You will graduate from the Airplane and Engine Mechanics School fully equipped to command a big-salaried job. Parks graduates are in great and constant demand—because aviation executives know that Parks training is the finest, most thorough of its kind. Many Parks graduates are headed toward even bigger things, for their training and ability have qualified them for executive positions in transport companies, as airport managers, and so on. Money-making possibilities for Parks-trained men are limitless.

Sign and send the coupon today and we will send you our handsomely illustrated catalog and full information.

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## KANSAS CITY

[H. H. JAMES]

**D**EVELOPMENT of the Kansas City Municipal Airport is moving forward rapidly. New buildings at the airport are being completed and others are under construction. The factory of the Butler Aircraft Corporation, being erected in several units, is nearly completed and operations are already started in the new building. One Black Hawk plane has been completed in the factory proper.

The new building housing the Bredouw-Hilliard Aeromotive Corporation is receiving the finishing touches. This company has a contract for servicing all planes at the municipal airport. It also carries a large stock of replacement parts for planes.

The third building nearing completion at the airport is the passenger station. This building will house the field administration offices of the airport management and of the air transportation lines using the municipal field.

These buildings comprise the summer's building developments at the airport and do not include the buildings of the Art Goebel Flying School, adjoining the airport, and those of other schools using the field as a base.

### Kansas City-Mexico City Race Announced

**A**N international air race from Kansas City to Mexico City, to start December 10 and with arrival in the Mexican capital the next day, has been announced by Capt. Roberto Fierro of the Mexican Air Corps. Captain Fierro won second place in the race from Mexico City to Kansas City, which was a part of the program of International Pilot's Reunion and Air Circus last month. He spent several days in Kansas City after the flight, and while in Kansas City received instructions from his government to announce the international derby as a part of the first air show of Mexico to be held in the capital city December 10 to 16. Tentative plans call for stops at Weynoka, Okla., a night stayover in San Antonio and another refueling stop at some point in Mexico.

## KANSAS

[E. W. PRYOR]

**A**T the expiration of its present agreement with Curtiss Flying Service, Inc., Cessna Aircraft corporation will handle its own sales, according to Major Howard Wehrle, Cessna official. A sales organization is being formed by Cessna interests to handle the sales. For several months Cessna has been delivering its output to Curtiss, but the agreement will not be renewed.

**T**RAVEL AIR'S "Mystery S" monoplane which turned up 260 miles an hour at the Kansas City air show, and which outran the Navy and Army planes at Cleveland, has excited the interest of the Army and Navy officials of five foreign countries, ac-

cording to R. A. Nordberg, Travel Air executive. Travel Air is to put the new job in production soon.

The Mystery S is powered with a Wright Whirlwind 300, is 28 feet and 4½ inches from wingtip to wingtip, 20 feet long, and weighs 1,400 pounds empty. It is well streamlined, with N. A. C. A. cowling and pants on the landing gear. It has a cruising speed of more than 165 miles an hour, and a landing speed of 75 miles an hour.

A sister ship to the Mystery S, powered first with a Chevrolet air-cooled in-line motor, has been equipped with a 250-horsepower Wright, and turns up a speed of 180 miles an hour.

**A** MODERN hangar with a showroom has been erected on Wichita Municipal Airport by the Stearman Aircraft Company. The hangar cost \$42,000, and is 80 feet by 120 feet, with a 20-foot addition running the length of the building. It is of Spanish design, with a deck arrangement permitting spectators to view events on the field. A 30,000-gallon cistern supplies water, and a heating plant is being installed.

### Yellow Air Cab to Use Buckley Planes

**T**HE Buckley Aircraft Company has contracted to deliver 200 low-wing, all-metal cabin planes to the Yellow Air Cab Company for use in air transport work, it was announced by Roy B. Buckley. First delivery is to be made by June 1, 1930. Work on the first of two factory buildings planned by Buckley has started, and will be completed within a month. Actual production will be started immediately thereafter.

Yellow Air Cab will absorb the entire output of the Buckley plant for a year, according to Gary E. Prebenson, president. The Buckley plane is a four-place ship powered with a Whirlwind 225. All delivered to the Air Cab firm will be painted black and yellow. C. L. Lamoureux, engineer for William B. Stout, has been placed in charge of engineering work on the Buckley monoplane. Erection of the Buckley factory on the 80-acre site opposite the Travel Air plant will start soon, according to Roy B. Buckley, president. Directors of the company include; Mr. Stout, Fred Buckley, Earl W. Jones, Joe Paul, and A. J. Christman, Jr.

## TEXAS

[CAPT. W. H. SCOTT]

**T**HE Lower Rio Grande Valley of Texas has started making plans to guarantee sufficient business for an aerial freight service that will carry early fruits, vegetables and other products from the Magic Valley to the north. The movement was started by G. E. Bell, of San Benito and Roland A. Laird, aviation secretary of the Dallas Chamber of Commerce. At McAllen and Harlingen, the development of the plans will be in the hands of D. W. Webber and Claude Carter. The fruits and vegetables to be moved are the tropical foods for which the Lower Rio Grande is famous.

Mr. Bell has just completed a survey of possibilities in the Valley and stated that he is convinced that the Valley could, within a few months, provide sufficient tonnage of this kind to warrant the service. Dallas will probably be the northern concentration point of the company in Texas, although most of the produce will go to the northern and eastern markets.

The matter was discussed with growers and shippers in all sections of the Valley. They are enthusiastic and promise much business when the line is opened, which will take place in time to remove the winter produce, according to present plans.

Fruits to be shipped by air will be the Papaya, early dates, grape fruit, and early truck produce. Four crops a year are produced in the Valley.

**N**INETEEN planes carrying 75 members of the Fort Worth Association of Commerce recently completed an International Good Will Tour from Meacham Field, Fort Worth, Texas, into Mexico and return. Scheduled stops included: Corsicana, Houston, Galveston, Harlingen, Brownsville, McAllen and Monterey, Mexico. On the return trip they visited Laredo, San Antonio, Austin and Waco. A. P. Barrett, president of Southern Air Transport, Jack H. Hott, manager of the Fort Worth Association of Commerce, and Hubb Diggs, chairman of the committee in charge of the tour, headed the party.

## SAN ANTONIO

[MABEL COOPER]

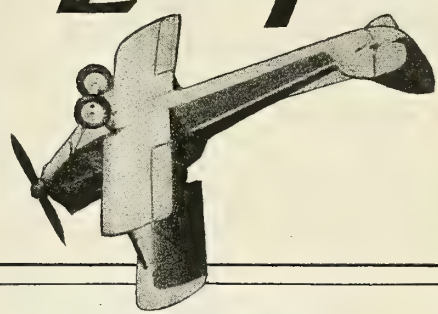
**O**F those making application for the class at Brooks Field Flying School which opened October 15, one hundred and thirty-nine have passed entrance examinations. Of these, 81 are Regular Army Officers, 48 are flying cadets, and 10 are enlisted men.

**P**LANs for the construction of two new airports near San Antonio is of interest to private and commercial pilots in Texas. San Benito, Texas, in the heart of the fertile Valley area near the Mexican border, has recently issued \$19,000 in bonds which will be used to purchase a 120-acre airport site. Plans for the building area are under way. Dr. A. D. Loyd, president of the airport enterprise in Piedras Negras, across the Rio Grande from Eagle Pass, Texas, has secured a concession for an airport in that city. This field will serve as the local landing port on the Mexican side for passenger planes.

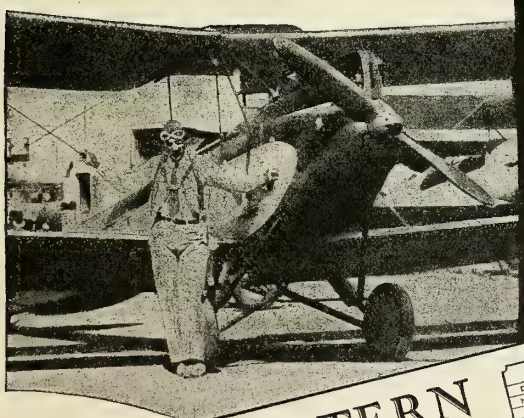
**H**EADED by T. D. Cobbs, assistant city attorney of San Antonio, municipalities of Texas which operate air fields are endeavoring to secure a modification of the four-cent gallonage gasoline tax levied in Texas on airplane fuel. The change is being sought in an effort to meet the needs of transient flyers.

The change would be made in the method of handling tax refund warrants, so that aviator purchasers of gasoline and municipal air fields selling gasoline to them can arrange a direct rebate.

# 6 Outside Loops in Standard MOTHS



*Lt. Garland P. Peed, Jr.*  
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*standard GIPSY MOTH plane in which*  
*he made several outside loops*



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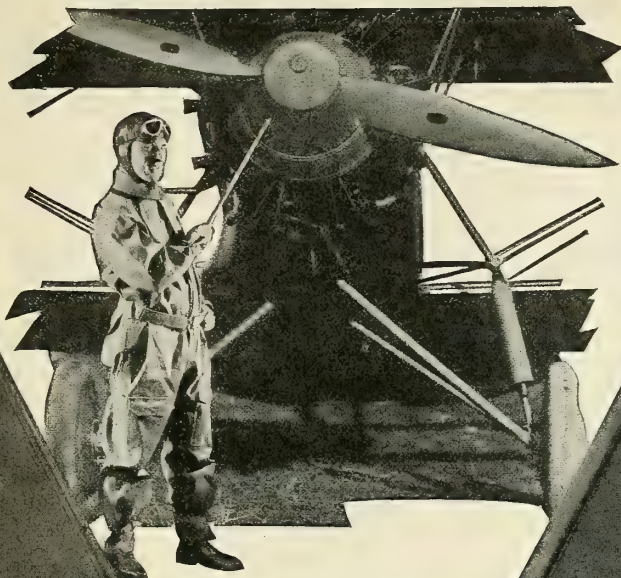




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## FLORIDA

PROGRESS in the development of airports and landing fields throughout Florida was reviewed at the aviation conference of the Florida Chamber of Commerce, which convened at Miami October 12. The conference was also occupied with the compilation of information on Florida's facilities for aviation and a general review of state and Federal legislation affecting aeronautical interests in Florida. Representatives of the Pan-American Airways, Inc., Curtiss Flying Service and Pitcairn Aviation Corporation attended the conference. Andrew W. Heermance, director of aviation for the city of Miami, headed the committee which outlined the program of subjects considered by the conference.

A SURVEY of the Florida Everglades from the air will be made this winter by three blimps of the Goodyear-Zeppelin Corporation. The survey is included in a program of development of the Everglade section into farming lands contemplated by the Everglades Drainage and Control boards. The blimps will be quartered at the municipal dirigible field at Miami, where the completion of a dirigible hangar is expected by November 20.

NEGOTIATIONS by city and naval authorities for a municipal airport at Pensacola, Florida, have been completed. The Chamber of Commerce has leased a portion of the old Corry naval field east of the Ferry Pass Road. A building to house a doctor, first aid supplies, and gasoline will be erected immediately, the first of several buildings to be erected on the field. Markers sufficiently large to be seen from the air will be placed on the field. Naval and commercial planes are expected to use the port.

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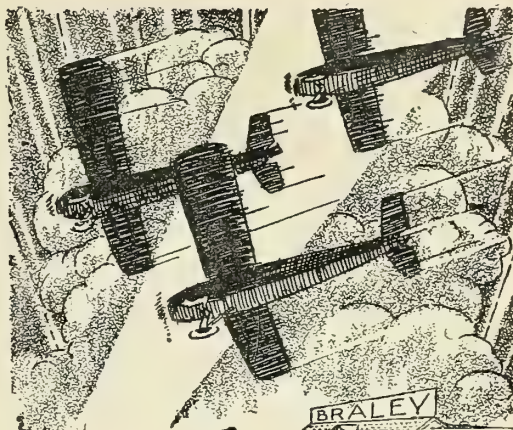
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## ALLEGHENY MOUNTAINS SOARING

(Continued from page 82)

taineers, farmers, millionaires and aviation enthusiasts crowded the knoll and even took a place at the shock-cord. Everyone was set. "Ready—Walk out—Run—Turn loose—"; sping. The hook pulled out, and the *Condor* was still with us. A disappointing anti-climax. The hook was reinforced; a storm swept over, but to our surprise, did not drench us. The wind was right, but there wasn't much of it—officially ranging from none at all to five miles per hour. "Ready—Walk out—Run—Turn loose." The plane was away. Too little wind to soar well, but she glided right at her boast of 24 - 1. Over the first ridge down in front. Off to the east to Bennett Field. Time: ten minutes. Distance: 4.15 miles. A flight had been made.

Then rain. A new hill was given a try. This time a better wind was up on the mountain. A good get away, and Klemperer climbed far above his starting point. But it was too late, and rapidly growing dark. He landed three miles away.

Saturday we had a weak west wind. Wally Franklin shoved off from Burgess Field in the "Old Veteran" of Ann Arbor, Schenectady, Albany, Williamsport, Akron, Cleveland, Columbus and Pittsburgh-Butler fame. That is the most flown glider in America, flown by the pilot with the most hours to his credit and the only American citizen to hold a Second Class N. G. A. license. He was towed by a Challenger. He reached a point 3,000 feet over our heads on the Bald Knob. He had a landing area, but a very small one. If he missed, he would have to glide back over the scrub-covered ridges six miles to Uniontown. He released and started downward. Would he make it? Most of the spectators thought he was started on the long ride. His brother and one other had confidence. They had seen him come out of too many close shaves to worry. At last he dived, barely missing the tree tops, and made a perfect landing without using even half the ground available.

Next day, he jumped off by shock-cord, with the wind almost southwest and therefore very poor. The first time, he was above the horizon about thirty-five seconds. He could not make it over the front ridge. We expected to see him turn down the gorge for Uniontown. Not he! Back he came right toward a point just below us. Would he land in the scrub? At least, the glider's sturdy steel tube fuselage would stand lots of punishment. There was a small hill-side pasture 100 feet below us. He regained some altitude by soaring and then dived. That fast accurate landing again. He made it, and the crowd carried his machine straight up to the take-off point. Again he tried. A better wind this time. He stayed up longer and cleared the ridge and started for Bennett Field. He didn't make it but landed within a half-mile. Distance: three and a half miles; Time: eight minutes. The *Veteran* had again lived up to her reputation. It is not a big soarer, remember, but a sturdy secondary training glider flown by a clever pilot.

More delay. Back to Dunbar's Camp. Monday, and Manager Walker deputized Thomas M. Whyel as official timer and shoved off for Akron and Detroit with Mosebach. Perhaps the "jinx" was gone.

It was Blue Monday, meteorologically and morally. But the "jinx" had shoved off. The wind was right. The fog drifted in from the desired northwest and at quite a rate of speed. The clouds broke away. On the mountain, the fog swept eastward.

On the hill. Much labor. "Ready—Walk-out—Run—Turn loose." and two American records were made. We will note Whyel's report:

"The *Akron-Condor* 527M took the air at 4:20 p. m. Monday, October 7th, at the Bald Knob above Dunbar's Camp in a west northwest to northwest wind about twenty miles per hour, launched by shock-cord, five people on each end (some of them children). The ship gained altitude rapidly and maneuvered ten minutes above the hollow between the Knob and Coolspring Gap. After turning around near the starting point at an altitude which appeared between 500 and 800 feet above the starting level, the pilot headed north. We followed the glider with the aid of 8X field glass for twenty minutes. The glider was going in the direction of Connellsville and, when it passed out of sight, was still considerably above the starting level. It was a beautiful sight to watch and interesting to see how in various places the gain of altitude alternated with level flight. The weather was gradually clearing after the low clouds that had prevailed about noon had lifted, although smoke impaired visibility west.

"News came through by telephone shortly after six p. m. that the *Condor* had landed safely at Dawson's Farm, between Wooddale and Stauffer. The air-line distance according to the U. S. Geological Survey map is 15.75 miles. The actual distance flown while the plane was in sight appeared to be about twice the air distance.

(Signed) THOMAS M. WHYEL  
Representative N. G. A. Contest Committee."

The *Akron-Condor* was designed by Frank Gross, recently of Darmstadt University, Germany; was built and is owned by the Baker-McMillen Company of Akron, Ohio, and flown by Dr. Wolfgang Klemperer, chairman of the technical committee and director of the National Glider Association.

Its span is 53 feet; length, 18 feet 4 inches; chord (maximum), 4 feet; aspect ratio, 20 to 1; weight empty, 304 pounds; gliding angle, 24 to 1; sinking velocity, 2 feet per second. It is of cantilever construction. Equipment includes altimeter, bank indicator, air speed indicator, compass, rubber launching rope and safety belt. The soarer can be dismantled in a short time for storage or to be loaded on a trailer. The fuselage is of plywood and the plane has a safety factor of 9. This ship has been towed by Klemperer behind a Goodyear-Zeppelin blimp and after release has flown for five miles over practically level country from an altitude of about 700 feet. Launched on a level airport by shock-cord, it has floated for 1,000 feet.

## THE WEST POINT OF THE AIR

(Continued from page 59)

sloping gently to the Salado Creek which provides drainage for the entire post. Seventeen farms have been razed of every stick of improvement, and of each shrub and tree, to provide an open flying space. Uncle Sam adopted the policy of placing the building area in the center—the first time a great flying field has been developed on such a plan—in order to give the maximum flying space. In addition, every power line, telephone line, or such structure has been laid underground, and even the railroad track is being laid flush with the ground in order to provide no dangerous obstruction in case of forced landings.

It is expected that practically all of the area will be used for training purposes. The student roll is expected to reach a total of 450 cadets, and there will be a ship for about two out of every three, although some officers fore-

(Continued on next page)



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## SALUTES THE AVIATION INDUSTRY



(Continued from preceding page)

cast that even a greater number of ships will be made available as the training center gets into full operation. The school buildings, hangars, and training areas are so planned that groups of students will be transferred from one section of the field to another as they progress through the various stages of their training for their Air Corps wings.

The personnel to be stationed at the field will consist of 350 officers, up to 500 flying cadets, and 2,000 enlisted men. Inclusive of the families of the married men of the field, the post is usually referred to as a city of 5,000 persons.

Construction of the first two units will require an expenditure of more than \$8,000,000, which has already been appropriated by Congress and is available. In addition, citizens of San Antonio bought the site of the field and presented it to the Government. The area thus purchased cost about \$500,000.

Viewed from the air, Randolph Field now appears to be a network of white ribbons, with darker veins crisscrossing the field where utility lines are being laid. The white network is the layout of streets, which have been laid with a base of white gravel characteristic of the section. Later, after the heavy hauling incident to the building is completed, all the streets will be given a hard surfaced paving.

Despite the immense sums involved in the creation of a new Air Corps Training Center, the Government nevertheless is in every way guarding against extravagance. This is evidenced in the fact that the low bid of \$3,229,000, made by a construction company of St. Louis, when bids were opened recently, was rejected as too high, and changes were made in plans and new bids sought. These bids are now being given consideration by the Quartermaster General in Washington.

In order to effect a reduction in building costs, changes were made in the plans for quarters for field officers and officers, bringing the cost of these structures to not more than \$14,500 and \$12,500 each. A few minor changes were made in the plans for warehouses. Although this first unit, with a total of 123 buildings, comprises only a small section of the total building area, it consists of six barracks, ten field officers' quarters, sixty company officers' quarters, forty-seven non-commissioned officers' quarters, one quartermaster warehouse, and one Air Corps warehouse.

Brooks Field and Kelly Field both are located at San Antonio, about twenty miles from Randolph Field. The progress of this great field, planned to be up-to-date at the expiration of the next half century of aviation history, is watched daily from the air by scores of officers and students from the two fields nearby.

Randolph Field takes its name from Captain William M. Randolph, a native Texan well-known for his military service and for his contributions to the advancement of flying. While on duty as adjutant of Kelly Field, he met death in an airplane accident at Gorman, Texas, on February 17, 1918.

Randolph Field is the realization of the hopes and plans of Brigadier General Frank P. Lahm. Through the keen foresight and influence of such men as those listed below the field has been made possible:

Major General Mason M. Patrick, former Chief of the Army Air Corps; Hon. W. Frank James, chairman of the Military Affairs Committee of Congress; Major General James E. Fechet, Chief of the Air Corps; Hon. F. Trubee Davison, Assistant Secretary of War for Aviation; Hon. Dwight F. Davis, former Secretary of War; Brigadier

General Frank P. Lahm, commanding the Air Corps Training Center; R. W. Morrison, president of the San Antonio Chamber of Commerce; L. B. Clegg, vice president of the San Antonio Chamber of Commerce; Col. W. B. Tuttle, chairman of the Military Affairs Committee of the San Antonio Chamber of Commerce; Judge Robert L. Ball, chairman of the Special Air Field Committee, San Antonio Chamber of Commerce; Phil Wright, acting mayor of San Antonio; Porter Whaley, manager of the San Antonio Chamber of Commerce.

## CLASSIFICATION NEEDED FOR INSURANCE

(Continued from page 62)

on the underwriting of the steamship and motorboat industry as a model, the result would certainly be more in keeping with a sound system based on a logical classification and apply an extra premium or no extra premium as the case may be to each subdivision of this classification. Then each application must be subjected to this system. It will be bound to fit somewhere. Insurance companies may, of course, find their extra premiums in some cases a little too high and in others too low, but if they continue steadfastly along this line, I believe by the law of averages alone they will eventually evolve a sound system of aeronautic underwriting.

The first step in underwriting is to divide the industry into two great divisions; namely, the passenger on one hand and the participating individual on the other. There are no other great divisions. All underwriting diverges at this point.

The term "passenger" as used throughout this article means one who travels as would any passenger on the railway or steamship lines, the motorbus or any other common carrier. It is simply a means of transportation to him. The extra hazard in this division is practically nil, so much so, that the applicant can safely receive insurance at standard rates.

The accidents of which we read so much in our newspapers occur usually in other than transport flying. The records of the Department of Commerce for 1928, covering fourteen air transport lines, show the experience of these companies over five million air miles, which is more than two hundred times around the earth. Out of these miles flown, there were six passengers lost.

But just think of it—the Imperial Airways of London during the last five years has had but one fatal accident, although that organization has carried seventy-five thousand and passengers over three million miles. The figures of the great Luft Hansa of Germany during the last three years are also good. Two hundred thousand passengers were carried and fifteen of them were lost. This is approximately seven and five-tenths passengers per one hundred thousand carried. These figures will certainly materially decrease, and rapidly so, as the safety factors are perfected. It should be remembered that there is no mode of transportation which has made such extraordinary progress in so short a period of time as has flying.

The other great division is that in which the insurance groups are facing their underwriting difficulties. They really do not know how many of their applicants have or will now and then automatically place themselves in the first great division, but in most instances those applicants which they find in the second division are participating in the industry of their own volition. It is here that the real classification of the aeronautic industry must be made, if they are to underwrite the aeronautic hazard with any

(Continued on next page)



Over 3500 Engineers, Executives, Factory Managers and Foremen, Test Pilots, Technicians, etc., within the Aeronautical Industry are now paid subscribers to *Aviation Engineering*. The following are a few typical articles which have appeared in *Aviation Engineering* during the past few months.

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Analysis of Torsional Stresses in Airplane Wings.....  
by Alexander Kartreli and Edmund Chagniard

Aircraft Steel Problems.....by F. T. Sisco

Radio Telephony in Aircraft.....by Robert H. Freeman

Machining Aluminum and Alloys.....by R. L. Freeman

Aircraft Engine Production.....by George J. Mead

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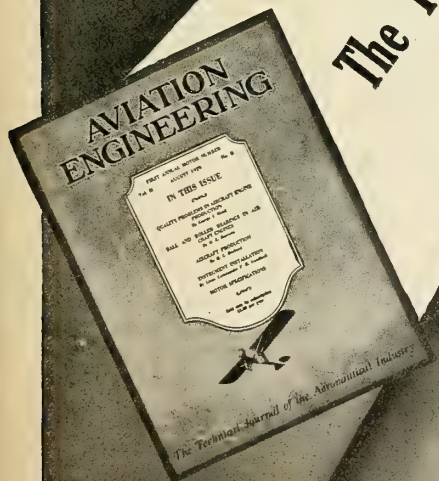
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(Continued from preceding page)

degree of success.

At the present writing, I believe, there is hardly an applicant in this division who should not carry some extra premium large or small. It has been, for some peculiar reason, the practice of companies to charge extra premiums based on the number of flights per year or upon the information as to the type of plane and the type of pilot flying the plane in which the applicant is to ride. Certainly this is a foolish and unsound practice.

In the first place, any plane today that flies across the country with a passenger, according to law, must be in the hands of a properly licensed pilot. In the second place, who can regulate by insurance methods what an individual will do when it comes to flying? Why should an individual be charged so much for so many flights in the past? That flying is done. It is not a question of what he has done in the past, but it is a vital question of what he will probably do in the future. Who is there who can tell that? There is only one justification for even taking into consideration the number of flights made in the past and that is that there may be in this information an index as to the applicant's desire to fly.

Another unsound practice is that of charging extra premiums depending on the terrain over which the applicant may fly. This practice indicates a lack of air-mindedness. Distance in time, therefore, the change in topography of the terrain, means nothing. It is impossible to confine your applicant to the terrain over which he may fly. It seems to me that the underwriting principle here must be as broad as the flying radius.

I thought it would be interesting to have some idea of the number of individuals actually engaged in the industry as employees and the experience as to fatalities and casualties by the companies employing them. Whatever figures can be gathered would be obsolete in view of the rapidity with which the industry is growing.

Nevertheless, I have made a rather superficial study of thirty-two companies in which I endeavored to learn what might be the hazard set forth by the individuals in their employ. It was found that these companies employed 59,178 persons. Of this number, 366 had duties that required them to go into the air. Eighty-four of them were test, demonstrator or other types of pilots. A most interesting observation was that there were only twenty-two accidents or fatalities which could be attributed directly to circumstances peculiar to the industry, such as the swinging of props, dope poisoning, etc. The average length of time that these companies have been in existence is forty-nine months, the longest having been twelve and one-half years and the shortest three months.

Underwriters must divorce themselves from the idea that the aviation industry is an industry of the air alone, for it is not. Actual flying constitutes approximately ten per cent of the activity. More and more every day we learn that flying is only the end result of a huge and carefully organized ground activity.

After companies have placed the applicant in one of the two great divisions above stated, they next must find his proper place in the field of aeronautics. And they will find that there are only three fields. He must either belong in the military, commercial or research field. And lastly, they must classify him as to whether he is a pilot, a passenger or a ground man. From here on, he is more minutely classified according to his occupation or reason for flying.

Let us now take for example an applicant who comes to the Home Office. The company in question places this

applicant according to its scheme into the proper classification and then, as one gets a finer adjustment on a scientific instrument by a vernier scale, the firm must obtain a finer adjustment of its applicant. This vernier adjustment can be made by considering seven additional items pertinent to each individual case.

*First, the sex of the applicant.* The female is only now commencing to take enthusiastically to this type of sport or means of transportation. She is not yet found to any great degree among the passenger lists. An examination of the mortality lists in flying makes her conspicuous by her absence, and I only know of one instance where a woman lost her life while she herself was piloting a plane.

*Second, the age is important.* Flying is principally a young man's game. After the age of forty years, the insuring company has little to fear regarding an applicant's learning to fly. It is felt by those agencies studying the individual and his time reactions that, after he reaches forty years of age, the reaction begins to slow to such a degree that the individual should begin to curtail his operations in the air if he is a pilot, should not be allowed to learn to fly if he is not a pilot. Furthermore, when a man has reached forty years of age, has a family and great responsibilities, he is not so likely to indulge in pleasure flying. These, of course, are generalities but the age limit will eliminate certain of the foregoing classifications, such as the test or demonstrator pilot, the transport pilot and some of the lesser commercial types.

*Third, the occupation is quite important.* It needs little explanation for the simple reason that the occupation alone determines the applicant's place in the classification.

*Fourth, the applicant's connection with the flying industry.* This determines the hazard in detail.

*Fifth, the date of the first flight.* As was stated before, it is a foolish practice to charge an individual for the number of flights which he has made in the past, but it sometimes becomes necessary to speculate as to just how much flying an individual may do. It seems reasonable to believe that the length of time which has elapsed between the first flight and the date of the application, and the aerial activities of the applicant within that period, should have a great bearing on the underwriting of the risk.

If, for instance, three years have elapsed between the first flight and the date of the application and only one or two flights have been made during that time, there must be some definite reason why more flights have not been made. This may be based on one of two assumptions. First, whether the applicant considered his finances, geographical location, or in general has not had the opportunity to take more flights, or, secondly, he is not keen about it. The date of the first flight then, considered in connection with the next item is an important combination.

*Sixth, why does he fly?* It is perfectly obvious that the answer to this question should have a great deal of weight in the underwriting. It is, of course, very closely linked with the occupation.

*Seventh, (it would seem that we are repeating ourselves, but we must always consider this point) is the applicant a pilot and, if so, what type?*

Almost every company which takes any steps at all on the application of determining whether or not the applicant has any connection with the industry uses a question which in its entirety reads something like the following: "Have you in the past made any aerial ascensions? Do you intend to make any in the future?"

The first part of this question is quite necessary, for it is  
(Continued on next page)



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(Continued from preceding page)

the only means of determining the applicant's connection with the industry. The second part sometimes presents difficult situations, from the standpoint of the insurance company. In the first place, there is many an individual who goes to a nearby flying field for the first time or for the fiftieth time who has no intention whatsoever of flying but who takes his first flight before he has left.

In the second place (and I write from experience), there is the man who covers up any intentions of flying whatsoever until he has secured life insurance coverage and then, after waiting a reasonable period of time, he begins a course in flying instructions. The situation places the insurance company in an embarrassing position. Companies today have no idea of the extent to which this method of obtaining insurance is being used.

In the third place, there is the man who obtains insurance with no thought in mind of flying but who probably shortly after having been issued his policy, finds himself obliged to fly as a passenger over regular passenger routes. Certainly this type of applicant is going to increase rapidly as time goes on.

Lastly, there is the influence that the records of air transportation companies are bound to have on the public at large. As I set forth before, the record for aerial transportation of passengers has been exceedingly good. More people are planning to fly each year, and when the time comes that aerial transportation has taken its place in the transportation world, we will not be counting our passengers yearly in six figures but more likely in nine or ten figures. How, then can any applicant say that he does not intend to make any aerial flights?

In conclusion, then, it would seem that instead of groping about in the dark and inconsistently rating applicants where the aeronautic hazard is concerned, the adoption of a simple classification would be more desirable and would show much better results. It is true that insurance companies cannot from experience today place an actuarial rating on each sub-division of the classification but they can place an arbitrary rating on each sub-division, which rating could be made after study, research and thought. If they then limit their amounts and follow through their scheme carefully, pausing periodically to study results, they surely will arrive more promptly on a sound underwriting basis than by any other means that I know. In addition to this it might not be amiss to devise a schedule of reviewing these ratings after a certain length of time and, wherever possible, assure the applicant that they will be reduced or removed according to the experience.

## EUROPEAN COMMERCIAL AERONAUTICS

(Continued from page 57)

reached by bus, automobile or taxicab. Since it takes from forty-five minutes to an hour to reach it from downtown London, depending upon street traffic and train service, this time element is not favorable, especially when considered in connection with the comparatively short flights of about two and a half hours to Paris and Brussels. Apparently the determining factor in the selection of this site was available area.

The administration building at Croydon is extremely well arranged. On the first floor is a large, well-equipped waiting room with the ticket and information offices of the various airlines opening into it on all sides through a series of alcoves. There are also provided a buffet, newsstand, ladies' waiting room, and a large map of the various air routes showing weather conditions at various locations. This map is kept current, and a very interesting method of

showing departures and arrivals of airplanes is maintained.

An enclosed passage, in which passport and other formalities are observed, leads from the waiting room to the airdrome. This corridor, which is part of the building, terminates at the platform upon which the departing plane is awaiting its passengers. When passengers board the plane, their luggage has already been placed aboard by attendants and properly stowed away. Another passage leading from the airdrome to the waiting room is quite similar except that it takes the passengers through the customs office, as well as through the passport corridor.

Here again the luggage causes the passenger no annoyance; it is taken from the plane to the customs counter for examination in his presence, and from there to the airline's bus or to the passenger's other means of transportation. There are no other entrances or exits either to or from the airdrome. There are, however, suitable places where motor cars may be parked and where the public may sit or stand to watch activities, but they are outside the enclosure of the airdrome landing field.

The second floor of the administration building contains a large number of office rooms which are occupied by the airdrome staff, including the weather bureau, the aircraft inspectors, and airdrome officers. Other offices on this floor are leased to various airlines for the use of clerical personnel and local representatives; and still others are available for expansion as activities increase.

An integral part of the administration building is a four-story tower at the side of the airdrome, which is surmounted by a radio mast. This tower contains a chart or map room and a radio room; from a platform surrounding it, traffic signals are displayed controlling the movements of arriving and departing planes.

Immediately adjoining the administration building is a freight and merchandise building for storage and customs purposes. A short distance away is a privately operated hotel, which has comfortable rooms, ample restaurant facilities, and a roof which has been made available for guests wishing to observe airdrome activities.

The hangars and shops are of conventional type and are located in the vicinity of the administration building—the shops for engine repair, overhaul and testing, being in the rear of the hangar line. All buildings are, of course, of fireproof construction.

Among the several different airlines operating from the Croydon Airdrome are Luft Hansa (Germany), Imperial Airways (Great Britain), Air Union (France), Sabena (Belgium), and Royal Dutch or K. L. M. (Holland). Each line maintains fixed schedules; and arrivals and departures are a matter of regularity which naturally contributes materially to the control of activities. Each plane, upon arriving, whether in scheduled operation or otherwise, must taxi to the platform, or "tarmac" as it is called, and report in; and the same is true of departing planes, which must taxi from the platform to the point of take-off and there receive a signal from the tower before starting the take-off run.

Only a relatively small amount of itinerant or non-scheduled flying is done at this airport. Flying instruction for the most part is carried on at flying clubs located elsewhere. This means that the dominating activity at Croydon is scheduled service.

### Le Bourget Airport (Paris)

The most famous airport in France is Le Bourget, located on the outskirts of Paris at about the same distance from downtown Paris as is Croydon from London. There

(Continued on next page)



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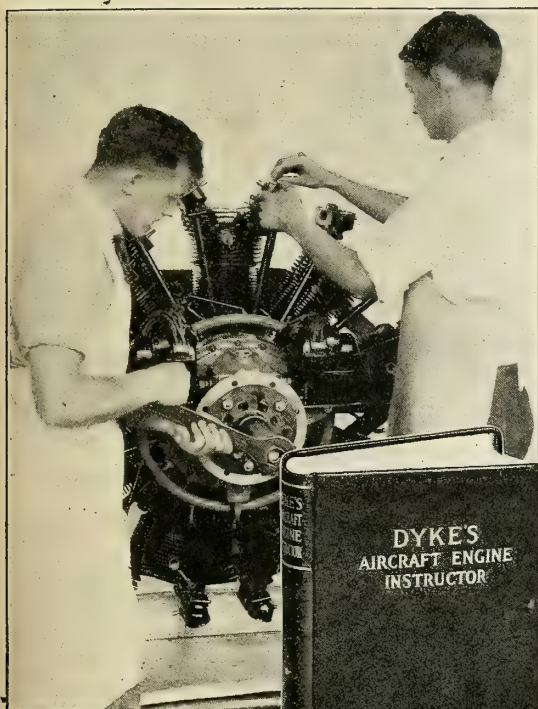


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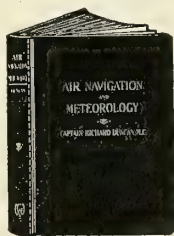
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is a street car service most of the way; but inasmuch as this is somewhat devious and comparatively slow the best way to reach the airport is by automobile, bus or taxicab. Under normal traffic conditions the airport can be reached in about forty-five minutes.

Like Croydon, Le Bourget comprises approximately 400 acres, and the arrangement of buildings with respect to the landing area is quite similar. The administration building, however, is not as elaborate, nor does it contain as great a variety of activities—the meteorological and radio stations being located in a smaller building nearby. Entrance to the airdrome is effected through a customs and passport room, above which is an excellent restaurant. There is an observation tower on which an airdrome employee is constantly stationed for the purpose of observing aircraft operations both on the airdrome and in the air. The hangars are located on either side of the main building.

The flying field proper is, of course, suitably enclosed, and no one is admitted except the airdrome staff, airline employees, passengers entering through the customs office, and other persons having business therein. Adequate parking and observation area is provided outside the enclosure. In addition to the several organizations already enumerated which use Croydon as a terminus, there are two or three other French lines operating from Le Bourget. There are also rather important local operations, taking passengers on sightseeing trips over Paris and environs.

As at Croydon, each arriving aircraft must proceed to the platform in front of the customs office and report in. Departing aircraft must also leave from the same place before taxiing to the point of take-off.

#### Tempelhof Airport (Berlin)

Germany's chief airport, Tempelhof Airdrome, is located within the city limits of Berlin, approximately fifteen minutes from the business section by automobile or bus. It now serves twenty-nine different airlines. Street cars pass within a comparatively short walking distance, and the service is sufficiently frequent for convenient use. Indicative of the ease with which this airdrome is reached, it is not uncommon for 20,000 people to visit it during a summer week-end when aircraft activities are at their height. Ample facilities for comfort and entertainment are provided, and the airdrome takes on a gala atmosphere upon the slightest provocation, even though a small admission charge is ordinarily made. The proximity of the airdrome to the city is a decided advantage and makes it extremely popular, not only with the interested observers, but with the users of air transport as well. On one occasion recently, more than 200,000 visitors assembled there to pay respects to some returning aviator of note.

The building, including administration, hangars, and shops, are arranged in conventional manner along one side of the airdrome, the center of the group being the administration building. This building contains the offices of the various airport companies, as well as the radio and weather rooms, postoffice, customs office, airport restaurant, waiting room, and the traffic offices of Deutsche Luft Hansa.

As is the case at Croydon, entrance to the airdrome is effected through the customs and passport offices by way of a canopied corridor to the loading platform. Immediately in front of the administration building and on either side of the entrance corridor, is a large enclosure provided with tables and chairs, which constitutes an outdoor restaurant and beer garden. Between it and the loading platform is yet another enclosure to which spectators are admitted.

In front of the administration building is a control tower from which all aircraft traffic, whether incoming or outgoing, is controlled by signals from the airdrome police. Five permanent hangars, of fireproof construction and unusual size, are located on either side of the administration building; they are provided with steel doors electrically driven and opening horizontally. Between the hangars are large repair shops, well equipped with overhead carriers, supplies, tools and machinery. Between two of the hangars is located an underground fuel tank of 40,000 litres capacity; in front of another is a 20,000-litre tank; and in front of a third is a 100,000-litre tank, the latter being equipped with electrically driven, centrally controlled pumps.

The entire airdrome is surrounded by a substantial fence, and in addition to obstruction lights, beacons, etc., the effective landing area is enclosed with boundary markers made up of neon tube units about seven feet in length spaced at approximately 300-foot intervals. An unusual but very desirable feature of this port's equipment is a broad, hard-surfaced apron extending the entire length of the hangar line. Approximately 300 feet in width, this apron greatly facilitates the maneuvering of planes in and out of the hangars and taxiing to and from the loading station in front of the administration building.

A hotel has not yet been provided, but it is believed existing plans contemplate the enlargement of the administration building or the addition of a suitable building for that purpose. Meanwhile the restaurant concession has been let to the Mitrops, an organization which operates the dining cars on the railroads in Germany and which also has the buffet privileges on the Luft Hansa airliners.

My recent survey of European airports convinced me that three things are fundamentally applicable to airport management and administration in the United States: (1) Adequate jurisdiction with a qualified executive in charge; (2) definite control of all activities, including their segregation when possible and advisable; and (3) uniform rules and regulations governing the operation of aircraft in the vicinity of the airport, and in landing and taking off. I am also convinced that the problem of airport management can be successfully handled without difficulty, if a competent executive with suitable authority exercises intelligent control over all activities, in conformity with uniform requirements.

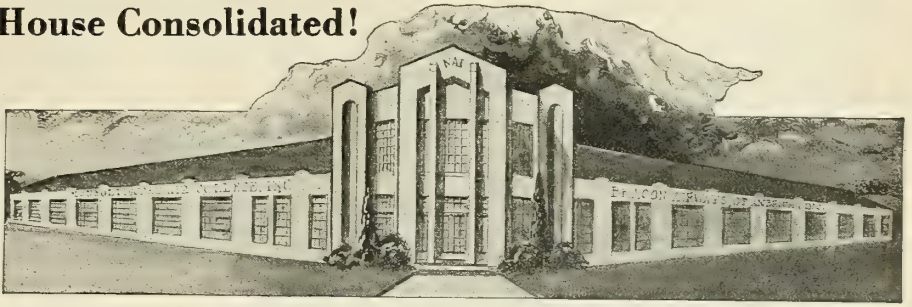
A combination of reliability, comfort, and speed is fundamental to the successful operation of any air transport system, whether it be in the United States, Europe, or elsewhere. This involves practically all elements entering into such a system—aircraft, pilots, ground personnel and equipment, airways, schedule maintenance, radio and weather service, and adequate airports. Fortunately, services operating wholly within the United States are not concerned with the more or less annoying business of passports and customs caused by the many border crossings in Europe. Many of the air journeys there, even though they are of only two or three hours' duration, place one in several different countries, with different languages, different customs and the usual examination of passports and luggage, formalities and immigration, public health, etc. Here, we can fly almost 3,000 miles and still be in the same country. Consequently, we seldom, if ever, see or hear of a passport or customs official, unless, of course, one of the several existing international services is used. This is a distinct advantage, and will react most favorably on our air transport system.

Despite this important advantage, however, American  
(Continued on next page)



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DETROIT, MICHIGAN

(Continued from preceding page)

manufacturers and operators realize that they can profit by the long operating experience of the European lines, and numbers of representatives of our aeronautic industry have visited Europe at various times for the purpose of studying their methods. One thing which they have learned from Europe is the importance of details, the refinement of comparatively minor things which either irritate or gratify the users of air transport. The manner in which passengers are transported to and from the airport, the facility with which their luggage is handled for them, the ease with which they are transferred to and from the aircraft, their comfort in the plane while enroute, all furnish examples of these details and refinements.

Although the actual transportation from one airport to another may seem to dominate all other phases, the passenger will not overlook the fact that he was obliged to trundle his own luggage in a taxi to the air port, to find his own way to the aircraft by way of the propeller blast, or to locate his own seat reservation. Nor does he like to amuse himself enroute by wondering over what location he is passing, by asking himself whether the aircraft is on schedule, or wondering where a blanket can be found when altitude makes the cabin chilly, or why the belt contraption is placed on his seat, or why the aircraft bounces around in rough air without knowing that it is a normal condition in particular localities. American air transport lines have already recognized the importance of these and numerous other similar details, and are giving very careful consideration to the comfort and convenience of the traveling public. Most European lines, too, have given this phase of air transport a great deal of thought, and that is one reason why these lines have been so highly regarded.

Because of America's freedom from international boundaries, great distances between centers of population, high standards of living, density of commerce and other inherent advantages, the development of a great air transport system is inevitable. Already American airplanes are flying more than 80,000 miles per day; already we have more than 15,000 miles of fully equipped airways; already we have a thousand airports, both municipal and commercial, in active operation, with an additional 1,200 either proposed or in the process of construction; and a number of the former are rapidly becoming the equal of any of the famous airports of the world.

It is necessary to be mindful that practically all of this has been accomplished within a period of three years, without direct government subsidy, and by private enterprise entirely. During that brief period of time, the air transport organizations have been able to train personnel and gain valuable operating experience, the aircraft manufacturer has concentrated on the design of aircraft especially adapted to transportation needs, and the Department of Commerce has made substantial progress in the development and establishment of a comprehensive airways system fully equipped with all known aids to air navigation. It all provides a most advantageous promise for the further extension of the air transportation services of the United States, whether for mail, merchandise or passengers, to any extent for which there can possibly be a demand.

Paper presented at the American Roadbuilders Convention at Washington, D. C., October 25, 1929.

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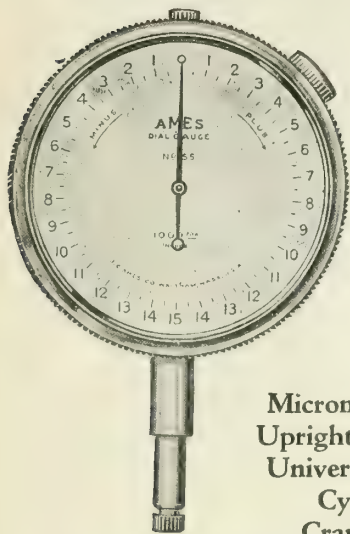
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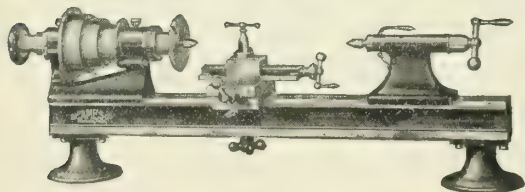
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### AIR—HOT OR OTHERWISE

(Continued from page 80)

MAN never has done anything successfully without the partnership of woman. Sometimes he thinks he'll get along without her, but when this happens he either asks her in, finding himself wrong, or she gets in in spite of him—or he nose-dives.

Women's direct contributions to aviation are called small by those of stupid minds. Instead they have been overwhelming, fundamental. Far greater than any man's. One woman contributed, for example, both Wright brothers. Another gave us Lindbergh.

Now women are actually flying, thinking aviation, talking it, and getting ready to contribute largely to its actual practice. The hand that rocks the cradle always has ruled the world. It evidently proposes, also, to have some definite share in managing the navigation of the envelope of air surrounding it.

Comments, spoken and printed, that have reached us about the Women's Air Derby, sponsored by the National Exchange Clubs, are all enthusiastic. That the ladies are to be ornamental in the air goes without saying. They will be ornamental anywhere. But also in the air they will be more than that. Women are to fly, even as they drive motor cars, perhaps more notably. They have proved themselves good pilots, even good mechanics—and we all know how wonderful they are as passengers!

Miss Amelia Earhart, the only woman so far to have crossed the Atlantic in an airplane, and now in charge of the Women's Air Traffic Department for Transcontinental Air Transport, in a recent speech on "Women's Influence Upon Air Transport Luxury," gave another hint of what the ladies are to do to us delightfully. She expects women to enter the aviation industry as they have entered others. At present, she says, fewer than 100 women are air pilots in America as against 8,000 men, but women's applications are increasing. It has been lack of interest and of opportunity rather than lack of innate ability which has kept them down in their proportion. She takes trouble to inform the women of the nation that no comforts exist in any means of travel which are not now offered by the ships of the more important airlines, and rather clinches the matter of whether or not she thinks air travel comfortable by saying that she now takes her mother with her on her trips. She adds, "and mother likes it."

That women are advancing in aviation abroad, as here, is indicated by the fact that after a long and bitter battle women there have won the right to be credited with such records as they make in the books of the Federation Aeronautique Internationale. Every man interested in American flying should do everything he can to stimulate women's interest in and approval of it.

NOT a month can pass during which it would be even reasonable not to mention with approval the procedure at Washington or elsewhere of aviation's most worthy, able and effective champion, Congressman W. Frank James, of Michigan. He gave nearly the whole time of the summer's Congressional adjournment to visiting the Army posts so that he might prepare himself with knowledge which would enable him later to act as the champion and protector of the men who live and work and hope in them—hope that Congress will do the really right thing by air. And he flew 57,700 miles while making his calls.

Congressman James is, unfortunately, the only one of his kind in the national legislature. We already have

passed a few remarks with regard to Senator Bingham, who, as president of the N. A. A., stands pledged to do similar work in the upper house but who, instead, keeps himself so fully occupied hiring propagandists for high tariffs, pulling wires for manufacturing interests (not aeronautical) and otherwise serving neither the people nor their national defense, that he has not time for aviation.

The only thing that Bingham wishes to keep up is the high cost of living. Frank James wants to keep the Army fliers up, keep them happy, keep them effective.

What a wealth of knowledge and real service would result if some member of the Senate Military Affairs Committee would follow the example of this member of the House of Representatives! Then, when the joint conferences occurred, it would be unnecessary for the learned Senators to call upon the War Department for their information. They would have some of their own. They would not need Department "prompters" to prevent themselves from looking foolish and from sounding silly, nor to rush into the lobbies to discuss affairs with Army men who have not been outside of Washington upon official duty for thirteen years.

Congressman James takes his job seriously, believing that he has been sent to Washington to serve the people's needs and not to kowtow to the uniformed and uniformly empty-headed special pleaders for the once rightfully respected but now obsolescent. The special groups cannot deflect him from his purposes any more than planets can be switched out of their orbits. His is an almost unique belief that it is the duty of official heads in Washington to serve the people. This makes him unique, and to those official heads, annoying. But we find it easy to admire, applaud and glory in him. In those fields wherein he pretends knowledge he is an economist with practical wisdom, not with theories formed from reading very likely biased and absurd reports of special-pleading experts.

Much will be heard from Congressman Frank James during the next session, and past knowledge of him makes us certain that any bill to which his name shall be attached will be for the real interests of the men in the service, the national defense and the people as a whole.

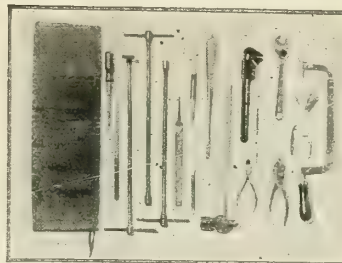
LATE in May, this year, Postmaster General Walter F. Brown declared at a conference of operators that the cost of air mail to the Government must be reduced through a general adjustment of carrying rates because the appropriation made for the purpose would show a deficit of three or four millions as the result of the great increase of business.

He sent for air mail operators who were at their busiest season, and took days of their time, finally explaining that they might go home, but that they would be called back later further to do their stuff, bringing records, wastebaskets and the office furniture and cats. Then, said Mr. Brown, a plan would be worked out. Wonderful. Net result: twenty-two hard-working air mail operators, who had been working very hard indeed, lost their summer vacations, feeling compelled to spend the heated term in study of their books and the building of a case to lay before their busy boss with sepia-hued name.

September 30th all were back in Washington laden with their scenery and shaking in their boots, each hoping that the expected cut would affect him as little as possible. At the first meeting they were told that each one would be heard separately.

A few such individual conferences ensued, and it developed that the plan of working out a "yardstick" with

(Continued on next page)



## AIRCRAFT TOOL KIT

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- 1/4 Inch Long T Handle Socket Wrench—Full Polished.
- ☆ "x 1/4" Engineers Open End Wrench—Full Polished Ends.
- 3/8 "x 1/2" Engineers Open End Wrench—Full Polished Ends.
- 9 Inch All Steel Adjustable Monkey Wrench—Full Polished
- 8 Inch Genuine Crescent Adjustable End Wrench—Full Polished.
- 8 Inch Mill File.
- 8 Inch Round File.
- 6 Inch Tungsten Point File.
- Berling Magneto File, with point gauge.
- Dixie Magneto File.
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Service Ceiling.....	10,000 feet
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Fuel Consumption at Cruising Speed.....	4 1/2 gallons per hour
Cruising Range.....	350-400 miles

**\$2965** Flyaway at field  
Complete with Le Blond  
60 H. P. Radial Engine

# DAVIS MONOPLANE

*"Sold under licenses covering all of the patents owned by members of the Manufacturer's Aircraft Association, Inc."*

(Continued from preceding page)

which to determine the amount the Post Office Department shall pay would not be as simple as Mr. Bub-Bub-Brown had thought. (Fear of him had set them all to stuttering.) In returning East from Sacramento he had taken his first flights upon the Boeing System and Western Air Express ships, and through his contacts at the Postal Convention apparently had discovered what the public thinks about air mail. In September he voiced views much broader than those which he had loved in May. At this conference with the operators his ideas were much modified. The P. M. G. was far less drastic in his stern calls for a formula.

The general thought is that he, by chance or otherwise, had visited the Wise Man on the Hill; in fact, I find it rumored that the President had sent for him.

At any rate, no formula was actually worked out after many morning, afternoon and evening conferences between the operators and the Post Office officials. While they were sweating at this job, the President named a competent commission to survey the whole air mail situation, being far too wise a man to tolerate destruction of a machine now serving an essential purpose until something quite as good or better is ready as a substitute.

So after the mail operators had been brought from Seattle, Los Angeles, Dallas, Chicago, Pittsburgh and other points diffusely scattered here and there about this great Republic, Mr. Brown, force-fed with advice from Wisdom, was not so sure as he had been that what he wanted was a formula, and became convinced that what he wanted was more helpful energy with which to stimulate the business of delivery of the nation's letters through assistance of the art of aeronautics. In other words, he learned that what a P. M. G. is for is to Get On with the Job, not to keep others from so doing.

But despite this general decision, a formula had been agreed upon by certain of the operators, and we believe that Mr. Brown is thoroughly convinced that rules will have to be devised which will cover the whole field by groups. No general practice can be found which will suffice to serve an industry, operating under diversified conditions, and, speaking generally, with little or no background of experience.

The situation is a little better than it was, but officials are uncertain, the operators are worrying, and public confidence is being undermined, while investments stretching high into the millions are rather sadly jeopardized by the whole affair's uncertainty.

Though some of the companies have made money, Mr. Brown might very well remember that to every dollar they have made out of the Government they have added two, three, four or five, so that they might build up a national air mail structure which is doing and will do more than anything else could to develop aviation for the nation.

Though Postmaster General Brown might think it brilliant to reduce the deficit that is likely to occur during the next five years (estimated at from \$100,000,000 to \$120,000,000) by three or four millions by starving the air mail operators, we doubt if the taxpayers (who are Mr. Brown's employers) would like it. We would suggest to Mr. Brown that he move very cautiously in taking away a possible profit to which the air mail operators, who have pioneered the work, plainly are as much entitled as railway and steamship companies (which make real money) are entitled to theirs. With fair encouragement these same operators will develop the network of air transport lines necessary not only to the carriage of the mail, but to the transport of passengers and express, should occasion require.

It should be remembered, also, that we must have something ready for our national defense when the already wholly futile Navy is reduced, as it will be, to a few submarines. A well developed air mail service will be the best feeder for the only passable substitute. If the Postmaster General could be made to understand that rash restrictions on air mail might seriously affect this nation's necessary protection against that dreadful aerial attack which we may regard as reasonably certain, prospects for a safe United States would be far brighter than they seem to be with him in his present job and present mind.

Four billion three hundred million dollars were spent last year throughout the world on national defense. We are not sure that this will show a profit, but we are sure that our three or four millions deficit in air mail costs will show a very definite profit to this nation. It will show it in development of business, education and friendly relationships of section quickly linked to section. It easily might be the means of making quite unnecessary the spending of that vast, that staggering, that unbelievable four billions and a third.

If anything shall ever bring to this old world the joys of universal peace it will be aircraft. That would be air mail worth receiving!

## WESTERN AIRCRAFT SHOW

(Continued from page 84)

success. There is ample evidence of the air-mindedness of the Californians. The management is doing everything possible to arouse their curiosity in advance with publicity and later to please them when they have bought their tickets and entered the exposition building.

Henderson has had splendid assistance from the numerous airport operators who were able to advise him as to where the general public interest had shown itself. This information has been the basic guidance for many features of the show. It is largely responsible for the larger number of reasonably priced ships which will be displayed, for the men at the flying fields are united in stating that the jobs which the ordinary person fondly hopes to be able to own in the near future are the center of interest. This does not imply that they believe there is scant interest in big ships; such being anything but the actual case. There is plenty of thought and attention given the three-motored jobs, etc.

During his flying trip East, which enabled Henderson to contact the Ford Reliability Tour, numerous celebrities of the flying world expressed their hope of attending the Western Aircraft Show. Cliff returned brim-full of optimism and enthusiasm, which is shared by every person associated with the forthcoming event.

## AERIAL PLOTTING CHARTS

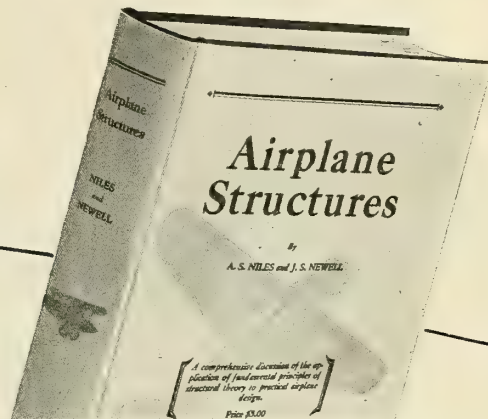
(Continued from page 78)

quickly direction and distance on the plotting chart. With this equipment, greater use would be made of efficient course flying as opposed to flying by the so-called "By guess and by God" method.

The flying game needs development along these lines, and anyone having any ideas for development should endeavor to complete them. The writer will be glad to co-operate with interested parties looking toward better air navigation.

A section of the Universal Plotting Chart is given to  
(Continued on next page)

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The methods of computation covered are those in general use by the industry in this country. They are the methods preferred by the Army, Navy and Department of Commerce.

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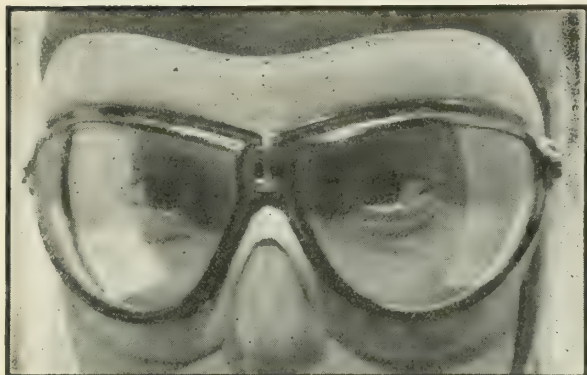
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The Willson Pilot Goggle is made to U. S. Navy specifications. Its meniscus-ground lenses are perfectly neutral, permitting horizontal vision of 135° through each lens, with no possible distortion through the entire field of eye rotation. That means a high factor of safety . . . relief from eye strain, and nerve strain.

The Willson Pilot Goggle is comfortable. Its sponge rubber mask makes but light contact with the face on account of its large area. The venturi-tube ventilating system of unique design has two important functions; it prevents fogging, and it creates a partial vacuum which holds the goggle, not too tightly, but firmly enough to prevent its blowing off—even with wind pressure from the side. The shape of the face mask and eye cups enables you to wear correction spectacles under the goggle, if required.

The construction of this goggle is a joy to those who admire fine things. Every joint, every screw, every *detail*, is made with microscopic precision. It offers the utmost in safety, comfort, durability. Yet it is priced no higher than many commercial goggles which do not meet Navy specifications . . . \$20.

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Flying fields and schools find these goggles an increasingly popular line. For prices and particulars, write direct.

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239 Washington St.,

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(Continued from preceding page)

show how small area charts may be quickly constructed for any latitude and longitude. An angle equal to the latitude is measured from the horizontal, and a vertical line is drawn through the point on the compass rose parallel to the vertical line through the compass rose. The distance between the vertical lines thus obtained will be the distance between all the longitude lines. By drawing in longitude lines for every two or three degrees of change in the latitude, we get a chart on the Mercator projection having a convenient compass rose at the center and a fixed nautical mile scale.

## SEWING UP THE CANAL ZONE

(Continued from page 61)

still used, but consider the past eight months. In that short time, a circle of American operated commercial airdromes has been traced lightly, but brilliantly and firmly around the danger zone; and for every possible move of the future there is now a counter move possible, and in the center of the board lies the Canal.

How far this development can be traced back to the Departments of State, War, Navy and Commerce is difficult to ascertain. That there is a link somewhere seems fairly obvious. If the obviousness portends actuality then perhaps we are not guilty of the blind, money grubbing, imbecilic, ostrich-minded diplomacy that some of our European friends would believe.

Whatever the cause, the bacon is safe at home. Consider how it got there.

Until February of this year, all foreign commercial planes were forbidden to fly over the Panama Canal Zone. Reason? An important military post.

In January, a substantially financial commercial company, with the finest flying personnel and equipment possible, opened full service after months of preparation from Miami to Havana to Camaguey to Santiago in Cuba, to Port au Prince to Santo Domingo to San Juan, Porto Rico; and the first quarter segment was traced. In February, the company traced the second segment from Miami to Havana to Belize in British Honduras and down the Central American mainland through Honduras proper, Nicaragua, Costa Rica, David in the Republic of Panama, to France Field in the Canal Zone.

The very day the second regular plane arrived on France Field—bango—the restriction on foreign planes was benevolently lifted. Reasons? Obvious. Good will on earth and peace toward men. The German-backed lines in South America could now start in with hearty competition. It was rather too bad for them, however, that that competition wasn't as successful as it might have been. I judge only the results. Less than six weeks later, American financed planes were across the Canal and winging along merrily down the west coast of South America on regular mail contracts, stopping at American-financed airports and heading for Peru and, later, Chile.

But there was still another step—the third segment and rather a ticklish one but—Boy, page Colonel Lindbergh again.

Legitimate? Of course it's legitimate. This is a commercial proposition. Where airdromes are, there money is to be made in everything from hot-dogs to real estate.

We speak not of Lindbergh the man; we speak of Colonel Lindbergh, the International Tradition. If you want to see the man, you must take the Tradition and what follows. Well—there he was a month ago tracing the last segment out from Porto Rico through the air of the Leeward and Windward Islands, down to the Main-

land of South America, closing the circle and sewing up the Canal. Where he has been, airdromes spring up over night. Airdromes that in a very few weeks flower into full service operation. Airdromes backed by American capital, run by American brains, servicing American-flown American planes.

Today the circle about the Canal is closed and as each day goes on, it becomes more tightly drawn. Somewhere around that circle, American commercial planes are always in the air.

As a transportation project, it is one of the most remarkable achievements of the present day. Distances are long and interspersed with sketchily traveled water hops and vast expanses of jungle and mountainous territory. Service was started on the barest safety minimum of ground facilities. The entire operation supplied a demand that was crying and that would have been supplied by any one of half a dozen other countries if the United States had not acted with the clarity it did.

The remote service to the country in any future crisis we may have to live through is immeasurable, but the glory for the achievement will probably never fall to the men who forged this most important link in the aerial independence of the Canal.

For aerial independence is what we have today and is what we must have the country over to replace the water isolation of years past. It is the only safeguard of nations. Today, territorial unity can be maintained only through territorial control of those vague quantities time and space, and time and space can only be controlled by air.

## THE FORD TOUR IN RETROSPECT

(Continued from page 65)

Reserve flier put Frances Harrell out of the race, the combination of a man in her way and an empty gas tank being more than Frances could handle at once. The accident was no fault of hers. We were sorry, but it was hard to be wretched about it, when it made her a fellow-passenger in the Condor.

Louisville lunched the tour with its usual Southern hospitality; St. Louis showed developing field and factories, and so did Wichita.

At Springfield, Mo., we found Frederick Karl Baron von Koenig-Warthaussen and the two-cylinder flying case of whooping cough which has taken him around the world.

Headwinds caused a lot of hedge-hopping along this part of the tour, and accounted for Hackman's crack-up—another incident that marked out a plane well up in the money but left standing the tour record of nobody hurt.

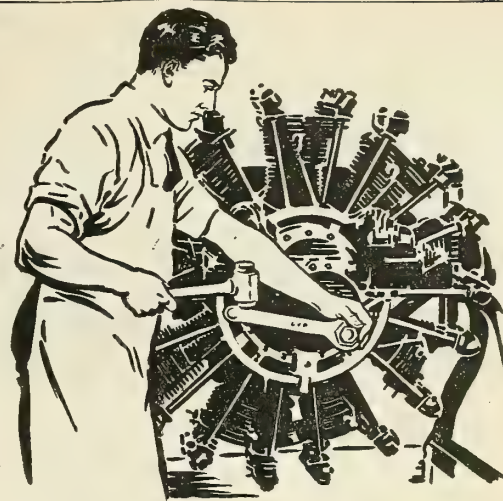
St. Joseph's hangar was gay with decorations as charming hostesses served a luncheon and Harry Block and Carl Wolfley led the male reception committee.

The gleaming dome of the Iowa state house was an outstanding beacon guiding to the Des Moines stop. Still in Iowa, the following noon, Cedar Rapids staged a dry grass fire among the automobiles, lending some excitement to the occasion.

"Speed" Holman and his townspeople gave the boys a good time in St. Paul; and Wausau, next noon, dedicated a tablet to Johnny Wood at the field he helped to make famous.

Milwaukee held off its bad weather until after dark, just as it did last year; had a good rain then, and furnished good weather for the take-off to Moline, the Sunday luncheon stop.

Then off for the big air show dedicating the new Curtiss  
(Continued on next page)



## Do you want a career in Aviation?

A GENERATION AGO, when the automobile business was just beginning to grow, a group of young men determined to make it their career. To get the mechanical training they needed for success, they studied at night with the International Correspondence Schools. You know their names. Many of them are leaders in the motor world. Walter P. Chrysler, President of the Chrysler Motor Corporation; Jesse G. Vincent, Vice-president of the Packard Motor Car Co., and Hiram Walker, Chief Engineer of the Chandler Motor Car Co., are among them.

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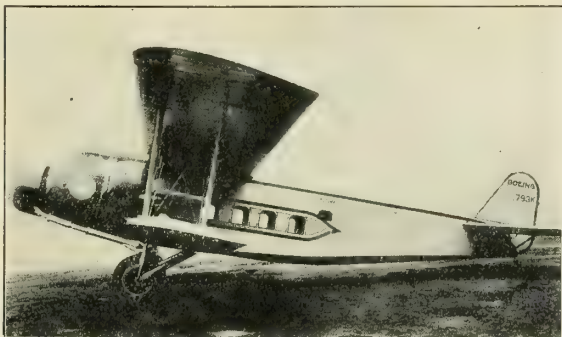
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(Continued from preceding page)

field at Chicago, a night in the big city, and the completion of the tour on the 21st, sixteen days from the start, at Detroit.

It was a tired but happy lot of pilots that zoomed over the Dearborn field, killing their last burst of speed, housed the planes and went into town to compare notes at the hotel.

Some of them are inclined to lament that the tour has become more and more a race, with hedge-hopping and full-throttle flying on most of the legs if one wants to save his place on the score card.

Although the pilots were agreed that the formula had been improved by halving the stick time, inquiry revealed the opinion among them that too much emphasis is still placed on stick and unstick, and that the conditions of the race can be improved by giving less prominence to it.

The argument is that almost all planes now have brakes and cities are rapidly getting larger and better fields, so that it is no longer necessary to put so much stress upon short landings and take-offs. Even with the formula improved over last year, the figure of merit established by low stick and unstick figures gives its possessor an advantage from the start of the tour that is hard to overcome.

Many pilots declared they would like to see something tried that will further minimize this advantage and lay more stress on other features of airplane efficiency.

Some people still maintain that the Reliability Tour isn't a race. Neither are some boxing matches real prize fights, perhaps; but many of them are a good imitation of one. And the ten cash prizes hung up for the best scores on the tour result in some lively competition for these coveted places.

Leaving Detroit, the figures of merit established by the tests there, under the tour formula, started the two Wacos, piloted by Livingston and Davis, in preferred position. Zeller's Ford was third, Hackman's Fairchild fourth, Crosswell's Condor fifth, Rowland's Cessna sixth, Haldeman's and Nagle's Bellancas seventh and eighth, Welborn's Spartan ninth, and Cone's Command-Aire tenth.

Next day Mrs. Keith Miller pushed into tenth place with her Fairchild, displacing the Command-Aire. And thus the standing remained until Springfield. Welborn's forced landing just after shoving off from Springfield washed out his landing gear, and Lacey's Cessna moved up into the money. Major Cone moved up a point past Mrs. Keith Miller, with due apologies to the lady.

Hackman won third position from Zeller's Ford as Philadelphia was reached, and George Haldeman's Bellanca moved into sixth place over Earl Rowland's Cessna. Earl was already suffering from appendicitis, and went into the hospital at Springfield. Mrs. Keith Miller had climbed up another point, passing Lacey's Cessna.

The Greenville stop saw the Condor drop to seventh place, points on the magneto drive shaft having been sheared off, disabling the left engine. A new magneto was hurried by plane from Long Island to Greenville, was speedily installed, and Crosswell by a night flight caught the tour planes next morning. His passengers traveled that leg by bus, and climbed into the plane again next morning, entirely disillusioned about land travel. While they were shivering on the highway near Wintersham for four hours, the bus having broken a rear axle, Crosswell and Voelter hummed past, directly above, in the dark, their lights showing the stranded travelers, at least, that they were on the right route.

(Continued on next page)



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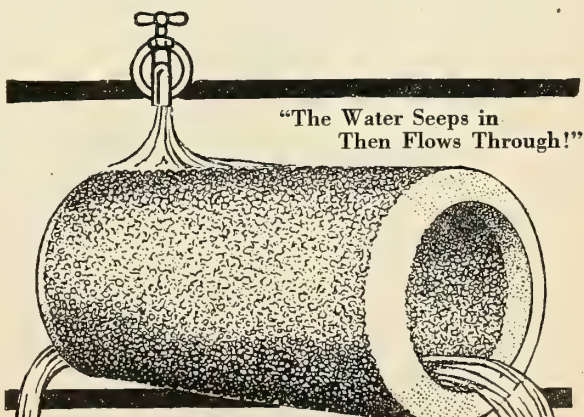
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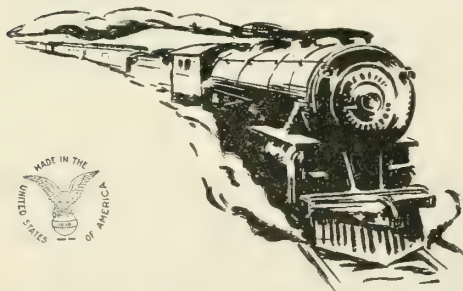




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*(Continued from preceding page)*

At this point the Cessna 33, which Rowland had been flying, dropped behind. It caught up later, flown by Joe Meehan. The change let Dale (Red) Jackson's Thrush into tenth place.

The Condor's higher figure of merit regained sixth place for the big ship on the leg running into Jacksonville.

Warner's Ford transport pushed in ahead of Red's Thrush in the run to Cincinnati, the Condor advanced to fourth place, Steve Lacey climbed up into the top ten and then had a forced landing out of Moline. Mrs. Keith Miller was winning much praise by her consistent flying; she came through the fog to Wausau to be fourth to ground her plane.

It was a good race to the finish at Detroit, and the final score tells the rest of the story.

Frank Hawks had a lot of fun introducing the pilots at the banquets. We had with us, ladies and gentlemen, the greatest aggregation of real he and she-pilots ever assembled, etc.

There was George Haldeman, now chief pilot of the Bellanca forces, not at all dependent on the Ruth Elder reminiscence for either his fame or popularity, although it will persist in coming up.

And there were Dale Jackson and Forest O'Brine, the endurance boys; Earl Rowland and Lee Schoenhair, known for races won and records made; Frank Hawks, the cross-country wonder; "Pop" Cleveland, holding up well under the strain of tour starter; John Livingston, top scorer and manager of a chain of Middle Western fields; Major J. Carroll Cone, ex-politician and prominent business man of Little Rock, and head of Command-Aire, Inc., Capt. Wm. N. Lancaster, of London-Australia fame, and a host of others who, as Frank said, are just as good but haven't had the publicity.

J. W. Crosswell, whose middle name is "Bill," was right among the home folks at Atlanta, and they almost mobbed him and his Condor plane. His parents live there, and his mother and sister were on the line to see him set the big plane down with one of his model landings.

And then there were the ladies—Frances Harrell, May Haislip and Mrs. Keith Miller, as skillful at the controls as they are charming on the dancing floor.

Nor was the tour without its bride and groom—this time Mr. and Mrs. Stanley Stanton, Stan piloting a Cessna and the bride admitting that she is learning to fly.

Roger Q. Williams, of New York-Rome fame, piloted an accompanying ship—Levine's amphibion, the Triad.

Al Krapish proved, not only a good pilot, but a whiz at repairs. He belonged to the Sikorsky group for three or four years, and knows how to start with nothing and build a ship. So when he cracked up his Moth making a fancy landing to show what wing slots will do ("plumb foolish," said Al) and everybody thought he was out for good, he rebuilt the ship in a few hours, and was soon tooting along with the bunch.

And there was Charles Meyers, as usual—the only pilot of them all who had flown a ship in all five tours. Charley knows his stuff, and knows his rights—and can be bristling in their defense one minute, and smiling the next—quick on the trigger, and a sure shot at the next landing field.

No one, of course is better known than Lieut. Wendell Brookley, of the Army, loaned with a plane to carry Manager Ray Collins between stops. He has done big stuff for several years, and is one of those living arguments for a

*(Continued on next page)*

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**T**HE Champion Aero A Spark Plug differs from all other spark plugs in basic design, because Champion makes no compromise with any other spark plugs when performance, safety, and dependability are paramount.

Champion engineers, after years of exhaustive research and experiment, made a radical change in design, and produced a plug specifically designed for better aircraft engine performance.

Retaining all the manifold superiorities of all Champion Spark Plugs, the Aero A is so designed that *it cannot be broken in such a way as to interfere with engine operation.* This plug is the first to use a dual insulator. The principle of dual insulation employs a secondary dome insulator of sillimanite for the protection of the primary. Added to this, the Champion Aero A is of two-piece, gas-tight construction, with special analysis electrodes, thus insuring a fixed spark gap and compression-tight cylinders.

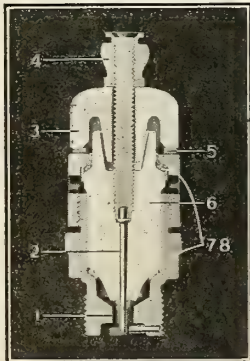
The carefully proportioned restricted bore affords an extra projection of center electrode which withstands a maximum amount of heat and oil without pre-ignition or fouling. The Aero A may be used in all radial air cooled and modern high compression water cooled engines.

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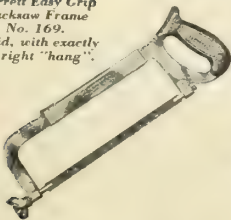


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(Continued from preceding page)

separate promotion list.

And now the 1929 National Air Tour has passed into history. It was a great success. It ought to mean a lot to the layman, and to the industry, that the fifth annual tour added 5,200 miles to the unbroken record of safe and speedy travel in the air set by the previous tours.

It seems a happy circumstance that the Ford Motor Company could step in this year and initiate the plans for another tour, carried on for four years previously by Detroit citizens and the Board of Commerce of that city.

All over the country hundreds of thousands of people were shown the speed and safety of flight in certified ships handled by licensed pilots. But there is plenty more educational work of the kind needing to be done.

Those who placed among the first ten in the final scoring are listed below, together with the plane entered and the number of points gained:

Pilot	Plane	Points Scored
1. John Livingston	Waco	45,772
2. Art Davis	Waco	41,108
3. M. E. Zeller	Ford	38,494
4. J. W. Crosswell	Curtiss Condor	33,796
5. George Haldeman	Bellanca	33,272
6. R. A. Nagle	Bellanca	31,090
7. J. C. Cone	Command-Aire	29,711
8. Mrs. Keith Miller	Fairchild KR 34	28,504
9. W. Wellborn	Spartan	28,311
10. B. S. Warner	Ford	28,090

#### RELATION OF COLOR TO VISIBILITY

(Continued from page 60)

visibility cannot in any way be compared with visibility as regards signal colors, or advertisement colors.

Having established data concerning solid color, our next logical concern was with combinations of color, for solid color ships are not particularly attractive. We found that color blends at a distance into one color, and this blend can be so regulated in the majority of instances as to produce the required silhouette effect. For maximum mean visibility we are concerned with the blend itself, with how the ship will look in the air at a distance, not how it will look in the airplane hanger. The following summarizes briefly the results accruing from our tests of two color combinations.

Red and yellow—gave orange or yellow; good visibility.

Orange and yellow-green—gave yellow; good visibility.

Green and red—gave orange, yellow and yellow-green; good visibility.

Green and yellow—gave gray; poor visibility.

Green and violet—gave dark blue, cyan blue and cobalt blue; good visibility.

Red and blue—gave violet; good visibility.

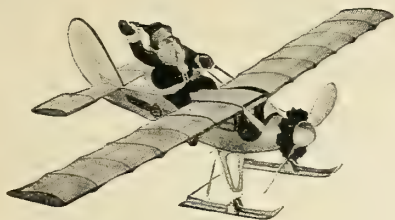
Red and blue-green, or orange and blue, or yellow and blue, or green-yellow and violet—gave gray; poor visibility.

For greatest mean visibility our best combinations are: red and yellow, orange and yellow-green, and green and red.

It is interesting to note that the two colors which in solid color give the highest degree of mean visibility, blue and yellow, when combined give us a medium gray which has very poor visibility, since it offers very little contrast with the average sky.

(Continued on next page)

# Silver Ace Models



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IF Christmas brings you a SILVER ACE, you won't have to wait months for warm weather to enjoy it. With these new pyralin skis, designed in type similar to those used by Commander Byrd in the Antarctic, you can, in one day, build a SILVER ACE Spirit of St. Louis or Fairchild cabin model, and fly it over deep snow and ice. Attachable with five minutes' work to all SILVER ACE convertible models, or to our famous flying Fokker with special wires. Skis, \$1.50 a pair extra at all dealers. Add 25 cents if shipped by us.

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(Times Wide World Photos)  
Take-off of the Pathfinder from Old Orchard Beach on the historic flight to Rome, made by Roger Q. Williams and Captain Lewis A. Yancey, Navigator.

(Internat'l Newsreel)

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6. Compass and Compensation
7. Correction of Courses
8. Cross-Country Work
9. Meteorology
10. First Aid
11. Air Commerce Regulations

APPENDIX

Course Error Table

Conversion table, Statute to Nautical Miles

Questions for review

Variation Map of North America

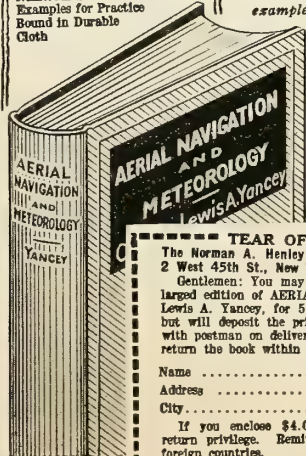
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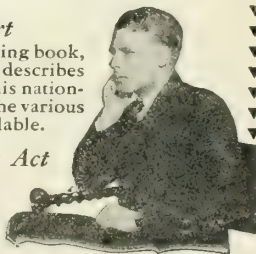
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(Continued from preceding page)

All this data is valuable from the standpoint of safety, but let us now consider another point of importance—namely sales. The aircraft manufacturer is interested in increasing his sales. Here again color will be an invaluable aid to him. But here we hit something of a problem. We must have variety, but we must maintain a high degree of mean visibility. Our ships must be attractive on the ground and visible in the air.

Color carries with strong suggestiveness. By that I mean that through color one is able to convey definite impressions. Green is excellent for refrigerators, because it suggests cold. Light pastel shades are used for women's toilet articles, for they suggest daintiness. White conveys the impression of cleanliness; ivories and creams suggest warmth with cleanliness; maroon conveys the impressions of strength, power, and reserve resources. Sharp contrasts suggest strength. The ability of color to carry impressions should be carefully studied and used in aircraft work. Dark rich colors for striping and masking, trim insignia, etc., will convey strength, especially when contrasted with a large area of light, strongly saturated color such as chrome yellow, for instance.

The value of color as a sales factor is closely linked with psychology, and this psychology properly applied will result in increased sales. A bright yellow ship finished in solid color would not, as far as the general public is concerned, achieve the popularity that the same yellow ship trimmed with maroon or cedar brown would, in spite of the fact that it has extremely high mean visibility, for the reason that it does not look strong or safe. The trimmed ship would have a greater appeal not only because it is safe but because it looks safe as well.

In coloring airplanes let us remember, then, that we have two distinct factors to consider—safety and sales. Considering safety alone, we find ourselves limited to certain blues, yellows, and reds in definite combinations. Considering the psychological and sales aspect, we find that we may trim with dark rich colors affording a high degree of contrast. These limitations, however, do not mean monotony or sameness. There are hundreds of combinations that can be developed within this range, each totally different. Manufacturers of aircraft are finding that, as the industry grows, exterior attractiveness becomes of ever increasing importance. But they will find, in addition, that unusual combination will be of real assistance to them in advertising, in making known and distinguishing their ships, in selling their ships and in production.

## AVIATION'S PROGRESS IN THE WEST INDIES

(Continued from page 81)

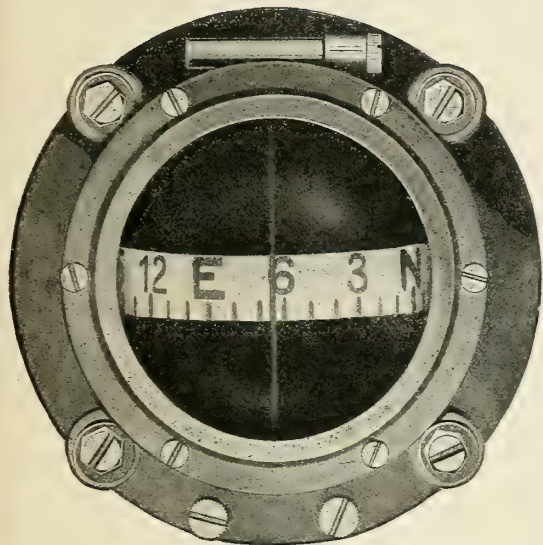
American officers did not choose to lay upon its stockholders. They have been content to work rather with the complicated pay ratio which will give satisfactory revenue flying from a combination mail and passenger load carried in the same planes.

This has not always been easy, nor is it likely to get easier. Swift and sudden increases in passenger traffic upset the operation schedule. Such additional passengers never pay immediately and all at once for the additional equipment which they require. They merely confront the airline operator with a three-cornered problem, which permits of no comprising: the three factors being, safety, equipment and Government requirements in the dispatch of mail loads.

On the Pan-American line one finds no compromise with

(Continued on next page)

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(Continued from preceding page)

any of these forces. The operation's record from the safety standpoint cannot be challenged. It reads one serious forced landing in 1,000,000 miles flown. To the Government and commercial mail interests it has provided for nearly two years a regular forty-eight-hour mail service through the islands, a service which had one interruption in eighteen months of service, a delay of two days caused by the extraordinary condition of the hurricane at the end of September of this year.

Next and most important we come to a consideration of the service which the West Indian airway gives to the traveler. America's commercial interests are being continuously advanced through the provision of a mode of transportation which enables our business representatives

to move with extreme rapidity from business engagement to business engagement in the islands. I found representatives of banks, American oil companies, coffee and sugar interests and all manner of export businesses constant users of the airlines. Some of the most enthusiastic boosters of the air project in the islands are men who for years, until the advent of aviation in the islands, had been making slow rounds from island to island by steamer.

But the larger air business of the future in the passenger field seems likely to come from the tourist trade. Pan American Airways already has realized this by organizing the first West Indian air cruise. The West Indies long have held a special lure for the sophisticated traveler.

Doing the islands by air, one catches at once of that elusive atmosphere which combines the exotic with the primitive manner of island countries. Through the extensive building of commodious air passenger stations and the providing of every comfort in air travel, the line makes easily accessible to the people of the United States, Havana, the new sports capital and winter resort of the western hemisphere, Santiago, with its historic scenes and settings, Santo Domingo, with its Colombian antiquities, and the much-heralded and much discussed primitive life of the other island republics. Here is a commodity readily saleable in the markets ruled over by travel bureaus. And it is almost axiomatic to say that, in the making of this sale through the medium of air transportation, there is being created a buying public which when it returns from its West Indian holiday may eventually show a readiness to use domestic airlines to meet more prosaic traveling needs.

The methods followed, the advantages gained which have resulted from the operation of this model West Indian airway have been applied to the other sky routes in the Pan American field. On the sea, the airplane has followed in Latin-America to effective advantage the routes of steamers, and on land, the trails of the pack burro and slow intra-country trains. The competition has not been stiff from these other forms of transportation. But the very absence of this factor has allowed American aviation projects to build solidly and firmly.

Pan American Airways in the first six months of 1929 carried 6,000 passengers over 3,500 miles of their completed passenger airways, and nearly 200 tons of mail over the entire system. This is admittedly only a start, but it is such a beginning as would appear to warrant the great effort now going on of carving airports out of jungle wildernesses and of pioneering the richer east coast route of South America, where even more valuable payloads await the courageous and practical airline operator.

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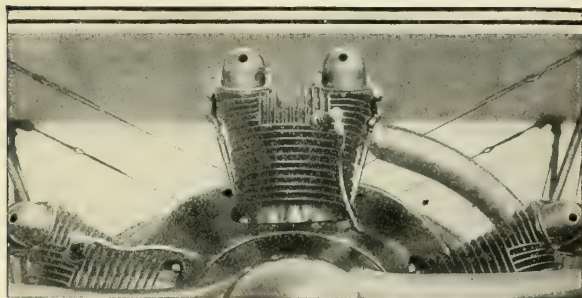
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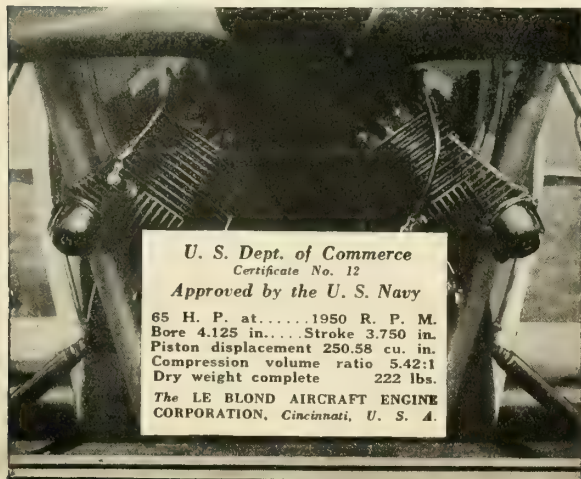
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### THE CIVIC ORGANIZATION'S PART

(Continued from page 74)

In our organization in Birmingham, we selected one man on a local newspaper staff and pumped him full of air and aviation, at every opportunity. Having "sold" him, we delegated him a committee of one to sell his newspaper. And so it was ordered.

In some few instances, editors feel themselves too unacquainted with the rapidly changing subject of aviation to discuss it intelligently in their editorial columns, and rather than face criticism for crass ignorance, they ignore the subject. Visits to them and sincere discussions of aeronautical subjects are generally well received and do, in a great number of cases, bring the desired result in editorials and editorial instructions that echo air-mindedness. Once in swing with the airport step, the local newspapers often become the most valuable aid in achieving success with an

(Continued on next page)

B. G.



## CLEVELAND AIR RACES

Women's Derby—Los Angeles to Cleveland  
1-2-3-4-5-6-7-8  
Standard Steel Trophy and Aerol Trophy—Phoebe Omlie  
Miami Beach to Cleveland Derby  
Class B—1-2-3 Class C—1-2-3 Class D—1-2  
Philadelphia to Cleveland Derby  
Class D—1-3 Class F—1-2-3  
Portland to Cleveland Derby  
1-2-3-4  
Oakland, California to Cleveland Derby  
1-2-3  
Non-Stop Los Angeles to Cleveland  
1-2  
Rim of Ohio Derby  
1-2-3  
All Ohio Derby  
1  
Event No. 1—Open to Women Pilots Only  
1-1-2-3 \*two first awards  
Event No. 3—Civilian Only—Experimental Ships  
1-2-4  
Event No. 4—Closed Event U. S. Marines  
1-2-3-4  
Event No. 5—Civilians, 275 cubic inches  
1-3  
Event No. 6—Pilots U. S. Army Attack Groups  
1-2-3  
Event No. 7—Mitchell Trophy, U. S. Army Pursuit  
1  
Event No. 8—Civilians, OX-5 Race  
1  
Event No. 9, Civilians, 510 cubic inches  
2-3-4  
Event No. 10—Cleveland to Buffalo Efficiency  
1-2-3  
Event No. 11—Solo Endurance Record  
1  
Event No. 12—Relay Civilians  
1  
Event No. 13—Civilians 720 cubic inches  
1-3-5  
Event No. 14—Liberty Engine Builder's Trophy  
1  
Event No. 15—Civilians Light Plane  
Speed—2-3-4 Efficiency—1-2-3-4  
Event No. 17—Civilians 800 cubic inches  
1-2-3-4-5  
Event No. 18—Detroit News Air Transport Trophy  
Speed—1-2-3 Efficiency—1-2-3  
Event No. 19—Civilians 800 cubic inches  
1-2-3-4-5  
Event No. 20—Multi Motored Ships  
1-2-3  
Event No. 21—Navy Pilots Pursuit  
1-2-3-4  
Event No. 22—Australian Pursuit  
2-3  
Event No. 23—National Guard Planes  
1-2-3  
Event No. 26—Free for All Speed Contest  
1-2-3  
Event No. 27—Dead Stick Landing—Men  
1-2-3  
Event No. 28—Ladies' Race  
1-2-3  
Event No. 30—Dead Stick—Women  
1  
Event No. 31—Australian Pursuit—Women  
2-3  
Event No. 32—Australian Pursuit—Men  
3-4  
Event No. 35—Aviation Town & Country Club Trophy  
Speed—1-3 Efficiency—1-3

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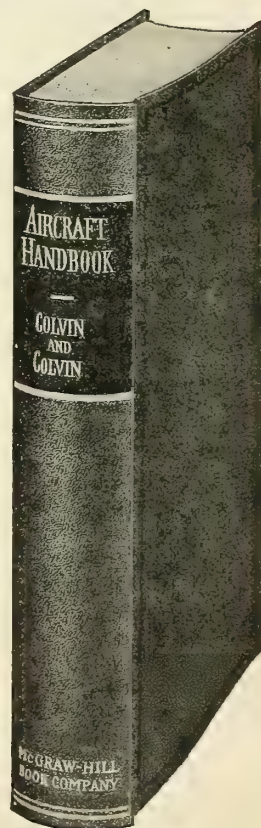
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- assembling Curtiss JN4's;
- tests of propellers;
- effect of altitude on engines;
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(Continued from preceding page)

airport program.

In many cities, luncheon clubs offer the best means of personal contact with the general public. Able speakers at the meetings of such groups can be a great influence in stimulating a public demand for a municipally owned airport. In addition, the newspapers usually carry write-ups of the luncheon club meetings, and each time the airport subject is mentioned publicly, more persons become cognizant of the rising current of thought favorable thereto.

In Birmingham, the Junior Chamber of Commerce was faced with the problem of convincing many that our small National Guard field was far from adequate to take care of the present and future needs of air transportation. The mail plane was using the field, and an air transport service had used it for a time for passenger travel. Knowing this, many persons were inclined to consider it adequate. To overcome the resulting opposition to spend a large sum of money for a municipal airport, we prepared a brief which cited all the disadvantages of Roberts Field for commercial use, proved that it would not answer our purposes even under the present requirements, much less the future, and pointed out what action was necessary to secure a municipal airport. This information was supplemented by examples of successful municipal ownership of airports and estimates of the probable cost as apportioned for the various improvements. This brief was mailed to the most influential citizens of the city, with the request that they give us their reactions to it. In reply, many of them wrote that they were whole-heartedly in sympathy with our arguments and that they were ready to give what help was needed—all of which was valuable testimony with which to convince others.

In developing the airport project, one of the strongest arguments is definite proof that operators are seeking larger airport accommodations in the community and that, with present field conditions, this demand cannot be satisfied. Preparation of air mail surveys and stimulation of the use of air mail fall rightfully in the scope of the civic organization, and tend to superinduce this demand by assuring the operators that they can expect a cordial reception and hearty coöperation from the city. Also coöperation with transport companies sometimes brings a written promise from them that, if the city provides an airport, they will set up operations there.

In our organization's development of the present route through Birmingham, C.A.M. 23, running from New Orleans to Atlanta, we communicated with the chambers of commerce along the proposed route, asked their collaboration in making estimates and guarantees of air mail poundage and then sponsored the trip of one of our members, Major Sumpter Smith, who made an actual survey of the proposed route by plane. While on this mission, Major Smith assembled many valuable and pertinent facts which were submitted to the Post Office Department. In addition, we urged and secured the pledges of the civic organizations to do their part in increasing poundage once the line was established. Continual work of stimulating interest along the line and continually reminding Government officials together with our Congressional representatives, of our plea, in time had its effect, and the route was established. Since it began operation, a year ago last May, we have kept our pledge to the Government, and by campaigns of education in the value of using air mail and by giving the operating company full coöperation, even to the extent of handling tickets for passenger travel free

(Continued on next page)



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(Continued from preceding page)

of charge, we have stimulated the interest of other operators, several of them saying they would locate with us—as soon as the airport becomes available.

In our petition for the Birmingham to Dallas route, we called a conference of all cities to be served by such a line, drew up our plan of petition and requested each city to compile accurate figures on its poundage, airport facilities and the probable support an air mail contractor could rightfully expect from business houses. These facts were then assembled into a composite petition and presented to the Post Office Department, with the result that this proposed line was recently announced.

These promotions also stimulated airport development in other cities which hoped to be served, and our scope of activity broadened until we launched a state-wide airport development program. In this, through the courtesy of Major Sumpter Smith and the 106th Observation Squadron, Alabama National Guard, we were able to offer to all Alabama cities interested in airport development the service, free of charge, of an experienced aviator and engineer. Although this program has just recently been launched, two towns already have secured airports as the result of it, and a score more have plans under way.

Our activity soon convinced our city government that the public mind was right and that a municipal airport must be provided. Accordingly, and at our instance, a commission was appointed to survey the entire section neighboring our city and to choose sites that might be available. This work once done, a Department of Commerce airport specialist was called in and placed his sanction on the site tentatively selected by the commission.

The civic organization's educational exertion should be carried forward, not for a month, but continuously. Coöperation and encouragement to transport companies can be given by the civic organization by enclosing their leaflets in civic group's mail, and so forth. The civic organization can, also, through a minute and determined study of airport conditions, advise with city officials on details of the airport construction. It can suggest and sponsor means of financing, when a bond election is impracticable. Frequently, it is advisable to call mass meetings of prominent citizens to discuss the matter of an airport or aviation promotion, particularly if there is occasion to impress upon those invited that the city's reputation for progressiveness is at stake. Where pleadings and arguments fail, it is often possible to stir people to action by the primitive, yet effective, psychology of fear. Business men, once they feel that their city is apt to be omitted from the picture of progress, will rise to meet the occasion and will carry the banner to victory.

Of course, such "stunts" as an aviation day, an air race, a state air tour, an endurance flight, or an air circus all tend to increase thought concerning the importance and practicability of aviation, but they are short in duration and are soon forgotten.

The function of the civic organization in the development of an airport program, then, may be summed up in the phrase: Educational Exertion—education through the newspapers, by means of luncheon clubs, by actual demonstrations of the commercial possibilities of planes, by coöperation with operating companies, and by the dissemination of an abundance of aeronautical information.

*Paper presented at the Southern Regional Conference of the Aeronautical Chamber of Commerce, Atlanta, Georgia, October 14, 1929.*

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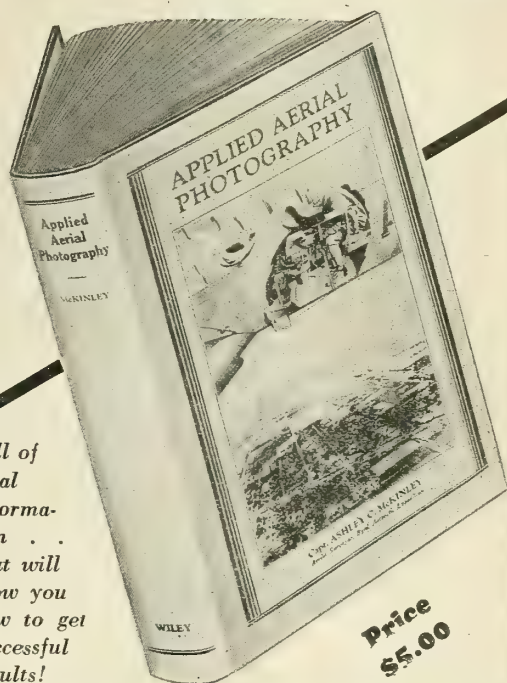
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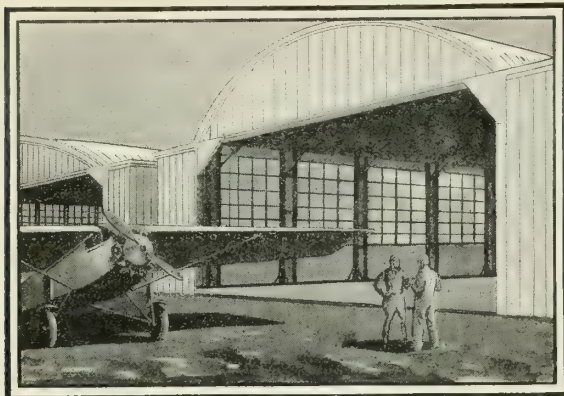
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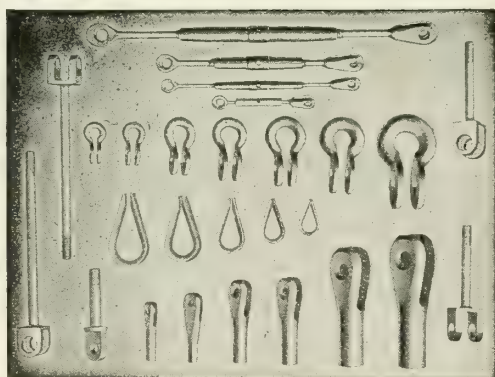


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### PLEASE PAGE BEAU BRUMMEL

(Continued from page 75)

boys of the neighborhood would come to the conclusion that I was advance agent for Ringling Brothers and Barnum and Bailey's World's Greatest Shows. And when they discovered to their chagrin and mortification that I was not followed by the entire circus parade, including the elephants and the steam calliope, they would perchance wreak their disappointment upon my person, in the shape of elderly eggs and moribund fruit.

No, Roscoe, insignificant though I look in my old blue suit, I yet must cling to it—or within it, I should say. Its very inconspicuousness charms me; in it I may slide through the world, exciting naught of comment, naught of censure, naught of admiration. Were you to endeavor to pry me loose from that old suit I would cower within it with all the desperation of a periwinkle that some fiend was trying to pry loose from its shell. I would moan and shout, calling aloud upon the three deities of the clothing world, Hart, Schaffner and Marx, to protect me. And as to getting a Sam Brown belt on me, after having worn one of the things for three years—just try to do it, that's all! And puttees, says you! During the same three years I spent every morning winding the wretched contraptions around my legs—and every afternoon re-winding them so they wouldn't look quite so much like decaying potato sacking that had slipped. No, no, bold Roscoe, speak not to me in accents wild about the benefits of army trappings. I'll have none of them. And don't try to sell that uniform idea to vest-pocket edition pilots like Charlie Meyers or Freddie Lund. You'd have all the old ladies exclaiming, "Oh! Aren't they cute!" And patting them on the head!

In his letter Roscoe enumerates a few of the features that make his uniform the desirable garment it is, in Roscoe's opinion. "A walking advertisement that instills confidence in your business and singles you out from the thousand others around you and tells what your business is." Yes, advance agent for Ringlings, or movie house commissionaire. And if you want to be a walking advertisement, why try to improve on the tried and true idea of the sandwich man? Let there be no doubt about you; why leave them to guess what wings mean? The simple and dignified announcement, in red paint, large letters: "Why live a tame life on the ground? Fly with me and visit another world!" That should knock them cold.

And, continues Roscoe: "It's an entrance to any place you want to go with no questions asked." The English here is slightly ambiguous, but it's all his own. Why should I, respectable and all as I am, sometimes, want to go to any place where no questions are asked? However, I'm sure that suit would get Roscoe in any place—it has done so in the past. He doesn't even need a pass at Air Races, or no more than a pass word. They did question him at Cleveland, but he merely said, "General Fechet, inspecting the Army!" They let him right in. Another advantage he enumerates: "A business getter, because it makes people feel at liberty to ask you where you are located and whom you are with."

To which the obvious answer is: "I'm located at Matteawan, and I'm with my keeper. Don't you think I resemble Napoleon?"

No, Roscoe, you may be right, and I may be wrong—I frequently am—but I say thumbs down on that uniform idea. I see your point in wearing it, and you're one of the few who could get away with it undamaged; I admit that in the old barnstorming days when you arrived un-

(Continued on next page)

# AIRCRAFT TURNBUCKLES

Commercial Specifications: Bronze Barrel with ends made from 3/4% Nickel Steel, heat treated. CADMIUM PLATED. Abbreviations used as follows: SF, Short Female; SM, Short Male; LF, Long Female; LM, Long Male; SFW, Short Female with Wide Slot; LFW, Long Female with Wide Slot; SFF, Short Female, Female both ends; LFF, Long Female, Female both ends.

Catalog Number	Barrel Length	Length	Adj.	Strength	Cable Hole	Pin Hole	Slot	Price
324 1/2 SM	1 1/4	2 7/8	3/8	1200	.156	...	...	\$0.20
324 1/2 SF	2 3/4	4 7/8	1	900	.120	.156	.125	.20
323 SM	2	3 3/8	1	900	.094	...	...	.35
324 SM	1 1/4	2 3/8	3/8	900	.120	.156	...	.35
324 SF	1 1/4	2 3/8	3/8	900	.120	.156	.078	.35
325 SF	2	3 3/8	.875	1350	.188	.156	.110	.35
325 SM	2	3 3/8	.875	1350	.188	...	...	.35
326 SF	2	3 1/8	.875	2150	.219	.188	.110	.35
326 LF	4	8 1/8	2.875	2150	.219	.188	.110	.50
326 SM	2	3 3/8	.875	2150	.219	...	...	.35
326 LM	4	7 1/8	2.875	2150	.219	...	...	.50
327 LF	4	7 1/8	2.625	2850	.281	.250	.110	.50
327 SF	2 1/4	4 3/8	.75	2850	.281	.250	.110	.40
327 SM	2 1/4	3 3/8	.75	2850	.281	...	...	.40
327 LFW	4	7 1/8	2.625	2850	.281	.250	.203	.50
327 LM	4	7 1/8	2.625	2850	.281	...	...	.50
327 SFW	2 1/4	4 3/8	.75	2850	.281	.250	.203	.40
328 LF	4	7 1/8	2.625	3500	.344	.250	.203	.50
328 LM	4	7 1/8	2.625	3500	.344	.250	.203	.50
328 SF	2 1/4	4 3/8	.875	3500	.344	.250	.203	.40
328 SM	2 1/4	4 3/8	.875	3500	.344	...	...	.40
329 LF	4	7 1/8	2.50	5000	.313	.281	.266	.50
329 LFW	4	7 1/8	2.50	5000	.313	.281	.266	.50
329 LM	4	7 1/8	2.50	5000	.313	...	...	.50
330 LF	4	7 1/8	2.25	8400	.359	.313	.266	.60
330 LM	4	7 1/8	2.25	8400	.359	.313	.266	.60
331 LF	4 1/4	8 3/8	2	11500	.474	.442	.365	.70
331 LM	4 1/4	8 3/8	2	11500	.474	.442	.365	.70
333 LF	4 1/4	9	2	16000	.568	.505	.411	.70
333 LM	4 1/4	9	2	16000	.568	.505	.411	.70

TRADE DISCOUNT: Dealer and School Discount (100 of a size, minimum order 500 turnbuckles) 25% discount; Wholesale discount (200 of a size, minimum order 1000 turnbuckles) 33 1/3% discount.

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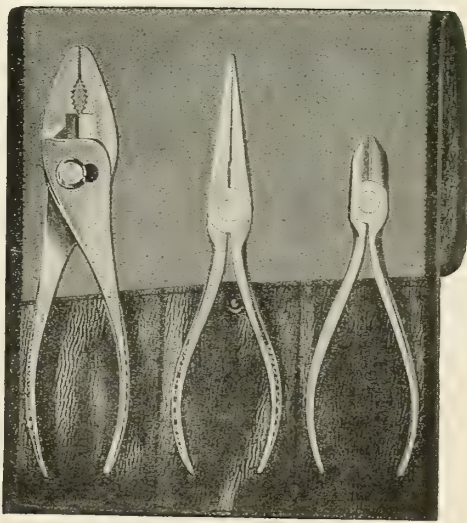
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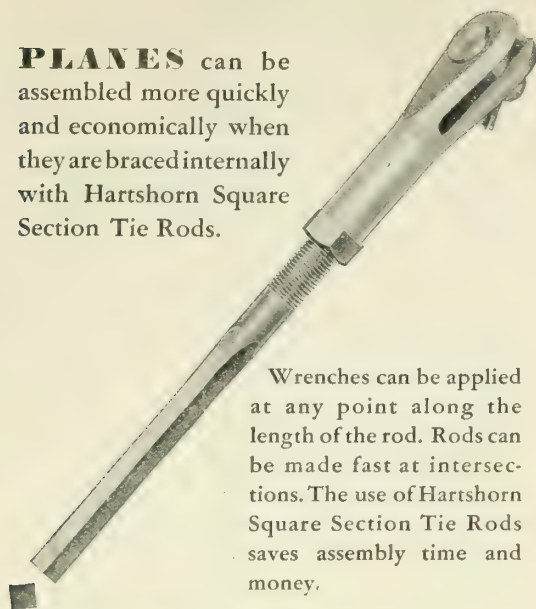
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(Continued from preceding page)

known in a new town that the uniform gave you a touch of dignity and made the yokels think they were flying with Pershing himself; I admit that it probably brought you business; and you do look well in the thing, when thousands wouldn't. But now we are off on a different tack in aviation. As I see the matter, we are trying, with some little success, to give the man in the street the idea that flying, after all, isn't vastly different from driving his own car. We are telling him that he may step into his closed plane, without even a helmet or goggles, and fly with the same comfort and assurance which he enjoys in his sedan; we are advising him to take the family along, without clothing any more fancy than that which they would fill out if they were motoring. In other words, the manufacturer of commercial planes, with an eye on the great public which buys motor cars, is telling that public simply to get in a plane and fly, and feel the same about it as toward any other form of transportation. The manufacturer is *not* telling the purchaser to feel any different than he would feel in his Chevrolet, nor to dress differently. In short, the man in the air is the same man who was on the ground, and when he returns to the ground he will be the same man who was recently in the air; the same suit will serve, no matter where he is. There is no necessity that he get himself up in the habiliments of a garage mechanic, a trapeze performer, or a Major-General.

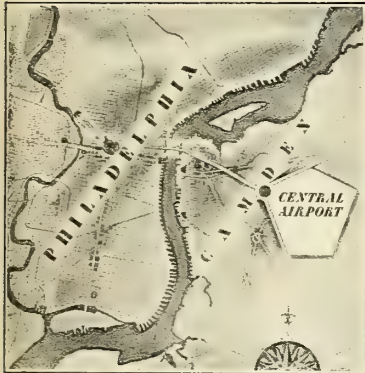
What I have said above relates only to the commercial pilot who is flying around the country on his own or somebody's business, selling airplanes or supplies, or merely touring. When it comes to the pilot on a passenger or mail line, the case is entirely different. Here we have an old and well-established precedent to follow. The officers and employes of all the various forms of transportation always have worn uniforms, from the captain of the crack liner down to the brakeman of the local. The public has grown accustomed to the idea that men engaged in transporting them about the country or across the sea should wear some distinctive uniform that readily identifies them. And this uniform is no degrading distinction, setting these men apart from the passengers, putting them in the servitor class. On the contrary, in the case of the officers aboard a passenger liner, the uniform distinguishes men who have not only the ship, but also the passengers themselves absolutely under their command. If you doubt that, go aboard a liner and, when you are out to sea, inform the captain that you object to the way he is running the ship and that you propose to take command yourself. You will then complete your journey in the brig, with metal bracelets adorning your wrists, while you ponder upon the fact that even though ship captains and butlers both wear uniforms, there is still a difference in the cut of the garments.

This being the case, I do not understand the objections that some old pilots on airlines have to wearing uniform. "Why should we dress like a chauffeur?" I have heard said many times. It isn't a question of dressing like a chauffeur, or a butler, or a waiter, or a red cap at Grand Central Station. It is a question merely of deciding what the public is accustomed to in other forms of transportation, and of devising a uniform that will give the official stamp to a pilot just as the uniform and various insignia give the stamp to the conductor of the train or the officers of a steamship. You will note I leave the buses out of this—the driver of that vehicle is a chauffeur, and pilots object to being called chauffeurs. A passenger of mine

(Continued on next page)



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(Continued from preceding page)

came near to getting a dislocated jaw when he said to me, "What time do we start, chauffeur?"

I kept my temper and replied politely, "At 3 o'clock, baggage."

And from the above don't draw the mistaken conclusion that any snobbish sense of social superiority causes me to feel that I am a better man than the chap who drives me from the airport in his cab. I may be better or I may be worse, but I'm not interested in knowing which I am. In fact, there's nothing personal in it at all. It is merely that there's a difference, a vast difference, in the two jobs. A man may drive a cab around the streets for a week and become a fairly good chauffeur; but he must spend at least 200 hours in the air and know a great number of things, arduously and painfully acquired, before he becomes a transport pilot. Therefore, having spent this time and gone to this trouble, the pilot feels that he has, not merely a job, but a profession; and he is proud of that profession and is jealous of anything that may seem to degrade it.

For this reason, I think, some of the old pilots have objected to uniforms, feeling that it turns them into cab-drivers. But it is an error to feel so. We are providing the public with transportation through the air, even as the officers of the Atlantic liner are providing them with transportation across the ocean; and it is entirely fitting that we should wear a uniform and insignia that will appraise the traveler of what we are. The passenger on the *Leviathan* would be surprised if the captain and the chief engineer appeared in the lining saloon in checked suits or overalls; he should be equally surprised if the pilots of the large air liner sat at the controls in coveralls or golfing suits. Aerial transport is a business, just as sea or train transport is a business; and the officers in one, as in the others, should wear uniform, if only for the reason that it is standard procedure in all other forms of transportation, whether on land or sea.

Fortunately for the aesthetic sense, if any, of pilots, the airline operators have, without exception, I believe, approved uniforms that are in no way freakish or queer. Plain suits of blue, with just the amount of gold braid and insignia calculated to charm the eye and flutter the heart of the traveling maiden, now encase the stalwart, or otherwise, forms of the piloting fraternity. And to my eye, at least, they look the better for the change. Most men look better, much better, in uniform, even though they cannot achieve the sartorial magnificence of a Roscoe Turner. It is to be hoped that from now on the pilot will take his place in the sun beside the officer of the liner, who, more than any other man on the face of the globe, seems able to fascinate, in one brief voyage, ladies who have remained impervious to the attacks of whole companies of mere landsmen.

Here I digress, for a moment, from the subject of dress, only to revert to it later, while I call your attention to a peculiar condition prevailing among pilots, and which these uniforms may alter. This condition seems to me to consist of an utter lack of IT among pilots as a class. I have mentioned the ease with which steamship officers fascinate the ladies—everyone knows of it—and I would add that many sea captains eventually marry ladies of wealth and charm, and straightway retire from the sea, confining their floating moments thereafter to the family tub or the deck of a yacht in Long Island Sound. Pilots, on the other

(Continued on next page)

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*(Continued from preceding page)*

hand, are notoriously bad shots in the matrimonial hunting preserves. Never, by any chance, do they bring down a lady possessed of sufficient oof, or mazuma, to enable them to land and spend the rest of their lives on a golf course, with a nineteenth hole. When a pilot does marry—and the silly fellow does, as a rule—he marries someone as poor as, or even poorer than, himself. From that moment on, he is chained to the joy-stick and the rudder-bar, even as the galley slave was chained to his oar, until death doth them part.

Do you, my six kind, and probably nit-witted, readers (or you wouldn't have got this far), do you know of any pilot who has successfully married out of the business? Do you know of one who has managed to marry a woman who could support him in the style to which he would like to be accustomed, and isn't? I'm sure you don't; for I know a great many pilots, and I know only one who married a girl with money—and since he already had so much himself that he didn't need any more, we needn't count him. But among the poor and deserving pilots I know—and I know hundreds—I don't know one who has bettered his lot by matrimony, except in that somewhat vague way in which we all better our lot, for better or worse—and if you're married you know which it usually is.

Now, why this sad state of affairs financial should be, I don't know. Aren't women supposed to admire courage and strength and the daring that takes a man across an ocean, strong in the hope that a collection of moving parts will continue to move at some 1,600 revolutions per minute? In days of old, when knights were bold, and wore woolen underwear, wasn't it considered the thing for woman, lovely woman, to cast herself upon the bosom of the returned hero and lisp, "Sir Launcelot, I am thine!" Wasn't it? Well, then, why is it that they do so no longer? What ocean flier has married J. Pierpont Astorbilt's daughter? What wealthy young woman, admiring "a man as is a man," has cast herself upon him and said, "Wilt thou?" Not a wilt have I heard, and I've listened intently.

Now, folks, there's something wrong here; there's something radically wrong with the woman of today, or perhaps with the pilot of today, when chivalry gets no greater reward than a bride from Woolworth's or Childs'. Not that they're not all right—I have Childs' to thank for many a snappy evening—but their names are missing from the Who's Who conducted by Dun and Bradstreet. Their financial rating, alas, is the same shape as a doughnut. Affectionate they may be, and often are, God bless them! But wealthy they are not. Yet, they're the only bride the poor pilot manages to snare. Spoken of favorably by the papers though he be, dined and winned and lauded by the Rotary Club and the Lions as he is, nevertheless and notwithstanding the rich girls leave him alone in his poverty.

And this lonesome condition, I venture to suggest, coming back to my original subject, will be alleviated by the uniform. In a uniform of blue, with gold braid and a saucy cap, who can resist him? What matters it that he merely hops back and forth, with the monotony of a pendulum, between Cleveland and Pittsburgh, the poor wight will at least look good to the women. At least, so I hope; though when I think of the number of Pullman conductors raising large families on their pay, and them, although in uniform, not married to rich wives either, my heart quails. Boys, all I can see ahead for you is to get your uni-

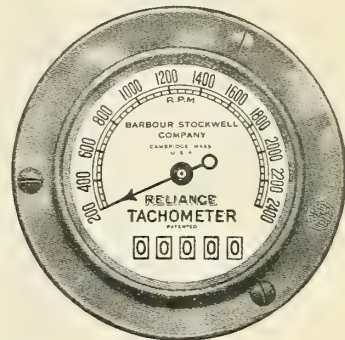
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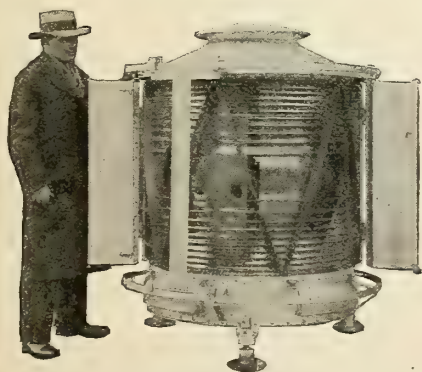
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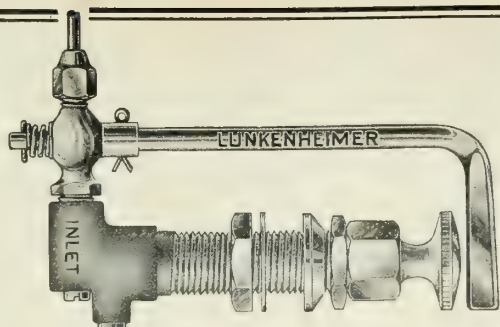
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(Continued from preceding page)

form, learn navigation, and join the Cunard Line.

But this discussion of haberdashery would be incomplete without some brief reference to the ladies among the air fraternity. Their case, I regret to report, is much more serious than that of the men, as I mentioned in an earlier article on the Women's Derby, and which was so well received by the dear girls themselves that I have been forced to ask for police protection, because of a couple of bullets that passed close to me while I was out walking. Fortunately, the girls were aiming carefully at me, so I escaped. But, as the Chief of Police has promised to redouble my guard and to send me a bullet-proof vest, I shall again tackle the problem.

The trouble is, they won't give up the trousers. I told them to heed Commodore Perry's advice, "Don't give up the slip!" But do they pay any attention to me or Perry? Not a bit of it. While the women of the country, those not flying, quote Shakespeare's famous words, "Too bare, or not too bare—that is the question," and then discard another garment or shorten the one they have, the flying gals are putting more on, and completely rendering null and void the charms with which a beneficent Providence endowed them. I can't do anything about it; I've warned them, I've pleaded with them, but they heed me not.

## THE WORLD'S NEW BOSS

(Continued from page 68)

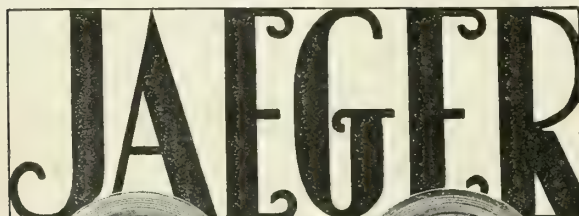
The storm passed away, and so—more or less—did Mr. Shearer. The investigation turned perfunctory and apologetic, and most of us forgot what Scotland Yard said about Mr. Shearer, and what Mr. Schwab said about Mr. Shearer, and even what Mr. Shearer said about himself. Most of us even also forgot again that fragrant line of old Doctor Johnson, who said that "patriotism is the last refuge of a scoundrel." The whole business became just one of those things, of which there are so many.

But those who have nothing better to do are wondering yet—not about Mr. Shearer, but concerning the company he kept. It was a goodly company. It included experts, diplomats, captains of industry and finance, philanthropists and politicians, and one or two altruists in the armament business. They all bought some of Mr. Shearer's peanuts, or winked an eye while somebody else bought them; and even when they discovered that the shells were empty, they said very little about it. Mr. Shearer wore out a lot of customers, but there were always more where they came from.

If Mr. Shearer had not been interrupted in his racket by the ingratitude of Republicans, he might have gone far and wide in his chosen profession. He might have sold Switzerland its long lost navy, fortified the one hundred and eightieth meridian against daylight saving, and armed to the eyebrows the seacoast of Bohemia. He might have provided every arm chair admiral in the world with his own battleship and prepared every nation for adequate defense against the preparedness of every other nation. He might have made us all "cruiser-conscious." That, it seems, is what the big-navy boys were paying him for, though they seem to have forgotten it.

Had it not been for public opinion, the world's new boss, Mr. Shearer might very well have become a burr in the whole world's undershirt. Instead he has become a publicity agent looking for more suckers. He will probably find them, for he's a smart boy. He was smart enough, for instance, to know that the average admiral is easy pickings, and that the biggest business men will

(Continued on next page)



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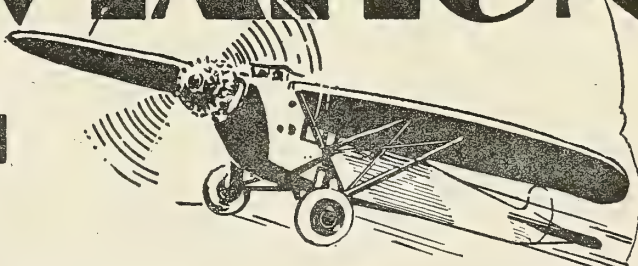
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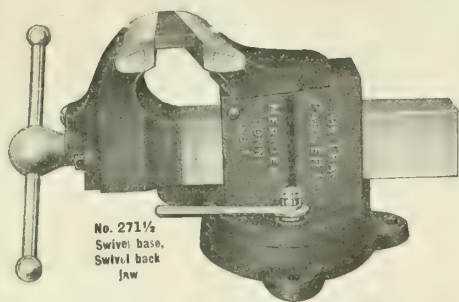
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(Continued from preceding page)

sometimes fall the hardest for the old shell game.

This is a very comforting thought. It cheers a man like myself, who can be taken across, and has been, to know that the so-called master minds of modern business can be taken too. On those occasions when I have lost my shirt in the stock market or broken down and cried over a subscription agent working his way through college, I have reflected afterwards that it was no more than might be expected. But I thought that the big business men were different. Nobody could sell them gold bricks and make them like it.

Mr. Shearer made them like it. What's more, he made them pay for it. On the witness stand most of them forgot what they paid him and why, but nobody doubts that they paid. The most outspoken of them has confessed that somebody in his office paid for something he didn't want and didn't get, which is my personal idea of an imperfect alibi, but the rest just took refuge in the recesses of a bad memory. It was a very illuminating performance, and we should be much obliged to Mr. Shearer.

By means of it I have figured out at last the three secrets of success. One is to be lucky, to know how to slip on a banana peel and fall into a fortune. A second is to have enough money to lose six bets and win on a seventh, which is a luxury no average man can afford. A third is to build a defense mechanism of secretaries, vice presidents, office boys, brass rails, mahogany furniture and conferences, so that nobody can ever get within reach of you to sell you anything. Take these away from some of these moguls, and a newsboy on a corner could match pennies with them and leave them less than carfare.

I should like to put a big business man up against the piano salesman who lately got into our house and signed us up for a piano. We didn't need a piano. We have a piano, even if it does have adenoids and fallen arches and a dislocated nervous system. We wanted the piano tuned, since it had become clear that either the piano or the family would have to be tuned in order to preserve the harmony of our happy home.

A gentleman came from the department store where we have a long-suffering charge account and looked at our piano. It was immediately clear that our piano gave him a pain. It afflicted him all the way down to the kneecaps. It hurt his tender heart and seared his immortal soul. With a single eloquent gesture toward our innocent children he dismissed all thought of tuning it. Instead, he sold us a new piano.

We have no idea how he sold us a piano. We have even less idea how we shall pay for it. We don't know the gentleman's name, except that it was not William Baldwin Shearer. But we would back him to sell battle-ships to the Peace Palace at the Hague or even to General Mitchell, if he were given a fair chance and an adequate expense account. Which was about all that the big bass drum needed when he played his profitable little tune for the shipbuilders and armament makers. For it seems that the bigger they come the harder they fall, and that anyone can trim the biggest sheep if the shears are long enough.

Mr. Shearer was stopped in his tracks, but it wasn't the Senate that stopped him. Public opinion stopped him,—public opinion which is sick and tired of paying taxes and tribute to the big-navy idea when the big-navy idea is out of date. Public opinion wants protection and preparedness, but it wants the program to be guided by common sense. It has had enough of paid propaganda

(Continued on next page)



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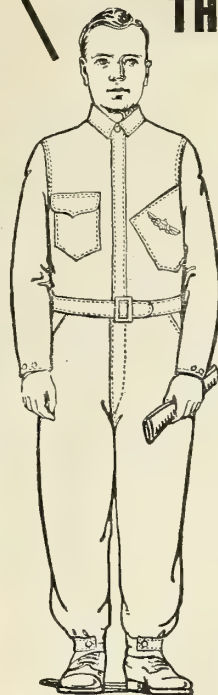
Manufactured in accordance with commercial specifications from SAE 3 1/2% Nickel Steel, heat treated and Cadmium Plated.

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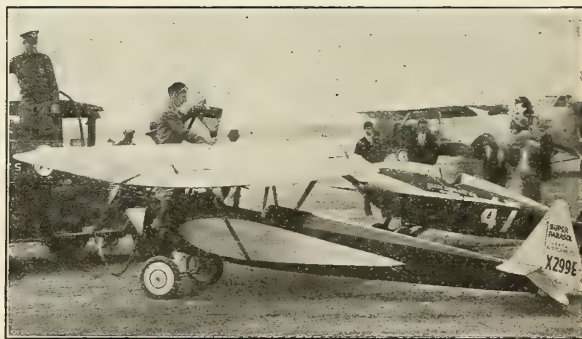
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Airlines in Warmth  
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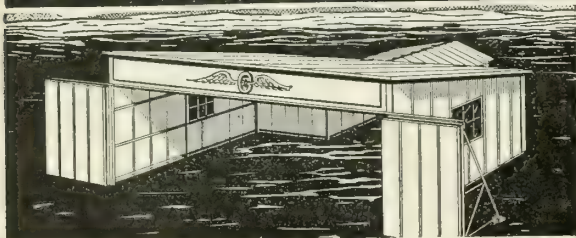
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## Protect your aircraft by housing it in an INDIVIDUAL ALL-STEEL HANGAR

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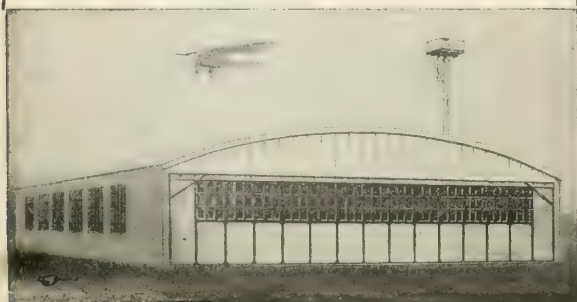
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(Continued from preceding page)

which disguises its real intentions in the red, white and blue of patriotism. Let us be honest with ourselves and with the rest of the world. Let us have a fighting fleet by all means, properly proportioned between sea and air, but let us quit spending billions for the benefit of armament industries. And let the big-navy men, if they can, stand up against public opinion when it speaks its mind.

On a lesser and local scale, public opinion has played a part lately in the interesting affair of the Philadelphia airport. There are, as you know, two ways to get an airport. One is to wait for business enterprise to build and equip it, which usually means a long pull and a lot of patience while the cash register catches up on the capitalization of such an undertaking. The other is to move heaven and earth and the city council until the community itself shoulders its share of the burden, regarding the airport as a long term investment and a sheer necessity of a modern business city. Philadelphia got off on the wrong foot when it took over its first airport, which was a piece of acreage admirably suited to submarines or the raising of ducks. Eventually, of course, it sank out of sight in the mud and hasn't been seen since. In its place there grew a plan to turn Hog Island into a three-way terminal for transportation by rail, sea and air, with a hitching post for dirigibles and everything. It was a swell idea, big as all outdoors and in scale with the city's needs. After a year of plugging and pushing from the faithful few, it got as far as plans and specifications and a lot of pretty promises, and there it stuck.

It would be stuck there yet and for years to come if it were not for the fact that public opinion woke up at last and kicked it heartily in the pants. Business organizations passed resolutions, private citizens wrote to the papers, editorial writers fussed and fumed. The air-minded citizenry of Philadelphia chased the mayor and his council into corners and out again, asking when and whether the airport would be finished. There isn't any Philadelphia airport yet, but it looks as if there will be, and it looks as if it will be something to write to Croydon and LeBourget and Templehof about. And when the dirt begins to move, if ever, it will be the force of public opinion and nothing else that is moving it.

Public opinion is busy indeed on this whole business of aviation. It is bossing the job, and riding roughshod over the pessimists and prophets of gloom. It is doing miracles and moving mountains, and no other power in the wide world could do as much. So long as it doesn't weaken, aviation will forge ahead, surviving even the optimism of its friends, the sour skepticism of its enemies, and the monkey business of those who think an airplane is just an excuse for making two shares of stock grow where one grew before.

## EVOLUTION OF RADIO BEACONS

(Continued from page 77)

number of vessels are seeking bearings may be such as to cause delays which cannot be tolerated in efficient navigation. With the compasses on shipboard any number of vessels may take bearings simultaneously without interference with each other.

"Sources of difficulty and error in the use of radio compasses on shipboard have occurred, but these appear to be capable of elimination with care, and there has been steady improvement of apparatus. Similar difficulties arise with the shore compass stations, which are by no means free from records of erroneous bearings. Many reports of it

(Continued on next page)

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FOR  
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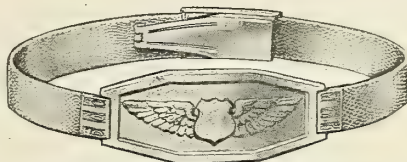
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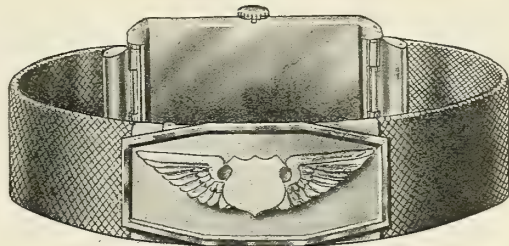
*"The Identification of Aviation"*



De Luxe  
Model

**\$5.00**

Worn by Pilots, Instructors, Students and all those allied with Aviation everywhere. De Luxe Model (above), Sterling Silver-tag, with either Yellow Gold Filled Wings or Sterling Wings, fitted with adjustable White Metal Mesh Band.



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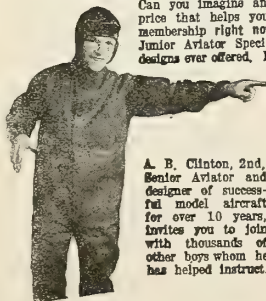
Can you imagine any greater value or any similar plan at any price that helps you to really study Aviation? Send in your membership right now and receive by return mail Plan No. 1—Junior Aviator Special Duration Scale Model, one of the newest designs ever offered. Easy to construct. Let's get off to a flying start.

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Senior Aviator and  
designer of successful  
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for over 10 years,  
invites you to join  
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has helped instruct.





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COME DOWN for a Chalfonte-Haddon Hall Thanksgiving, where everything is done for you. Turkey—and no trouble. Tables crowded with festivity—and no confusion. Dining-rooms luxuriously appointed. . . . And sun-rooms, a gymnasium, squash courts, Sandy Cove—a playroom for children; the near-at-hand ocean—all are here. And over all is the homelike spirit that makes people come and bring their families to Chalfonte-Haddon Hall.

Come with your family for the whole week. Golf a little, ride a little, or bask in a deck-chair in the sun. Write for rates and literature. A Motoramp garage adjoins the hotel.

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WHEN you invest in Angle and Sheet Steel Equipment, you invest in strength, permanence and economy. No "time out" for repairs or replacement here.

No. 3875 Cabinet, contains 54 drawers of varying sizes. Just the thing for storing small parts and dies. Over all,  $25\frac{1}{2}$ " wide x  $11\frac{1}{4}$ " deep x  $43\frac{1}{2}$ " high.

No. 9-26 Bench Legs. Top and girt are properly punched for fastening on of planks. Back leg continues up, and above top angle for 9"; this is used for fastening on of backboard and is hole-punched. Seven heights, 26" to 36". Top length 26", width at top 5".

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(Continued from preceding page)  
value of the radio compass in navigating the ship, in meeting vessels, and in seeking ships in distress, have been published, and it is not necessary to relate these here.

"Besides the general system of navigation with radio compasses on shipboard, there are several more limited special uses of radio, which have developed or which indicate useful possibilities. The most widely used of these is the system of radio compass shore stations referred to above. Another system is the revolving radio beam on shore, a radio projector so designed as to revolve a concentrated radio beam around the horizon, enabling a ship properly equipped to obtain its direction. It is limited to fixed stations, cannot be placed on a lightship and does not fulfill the general uses of the radio compass on shipboard, but it has the advantage of being independent of other radio service on the vessel. Several such stations are in operation. A fixed radio beam has also been tested experimentally with some success, but its use would be limited to furnishing a direction in fog similar to the use of range lights for leading marks in clear weather navigation.

"Important fog-signal stations,—for example, that at Nantucket Lightship,—are now equipped with three distinct fog signals; radio, sound in air and sound in water, the radio and submarine signals being synchronized to give a means of estimating distance. There is no present prospect that the sound signals can be discontinued because of the radio signals. The menace of fog is so serious, and the resulting losses of life and property have been so great that the cost of more than one system of radio aids to navigation would be justified if really necessary and valuable in furnishing adequate protection.

"Radio direction-finding has filled one of the greatest deficiencies in navigation by making it possible to take bearings of invisible objects, and further important progress and improvements in its use may confidently be expected."

### THE NORTHERN FLYING ROUTE

(Continued from page 67)

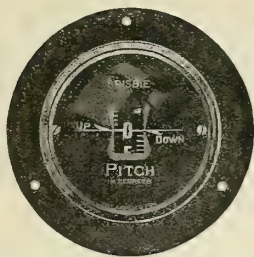
transatlantic flights, and has been considered for the terminus of an extension of the German airplane network. Angmagssalik has a long-wave radio station to report the passage of a plane, and can easily be supplied with gasoline, since it has steamer connection with Copenhagen once each year, usually in August or September. Its harbor is closed from the sea by ice for a large part of the year, but is generally free throughout September and October, as well as much of the time in August. It could probably eventually be made into at least an emergency stopping place.

A safe landing could undoubtedly be made upon the ice-cap itself within zones each at least 100 miles in width on either side of the central area. Within these zones, the snow surface of the ice is packed so hard as to leave no tracks from sledges passing over it. The central area, perhaps 100 miles in width, is covered over with deep mealy snow on which landing would probably be difficult (see Figure 4). Within the marginal zones, some fifty or more miles in width, the slope of the ice is steep and is covered by crevasses and by deep water channels. None the less, Hassell in the summer of 1928 made a safe landing at an estimated distance of only about ten miles inside the western ice margin.

The peculiar air circulation of Greenland is such that the aviator by regulating his altitude could probably cross in either direction with a tail wind for much of the distance (see Figure 5). We know that the surface winds

(Continued on next page)

## PITCH INDICATOR INCREASES SAFETY FACTOR

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Reading

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Other Propellers will be quoted on request

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## FAIRCHILD

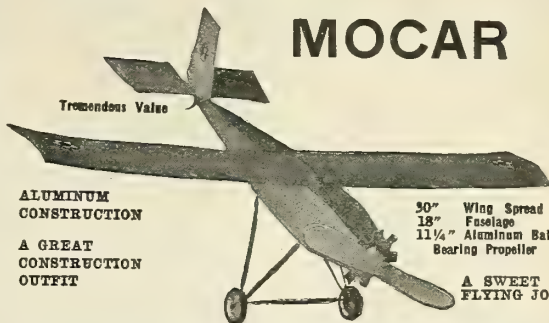
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BOYS—Never in your life have you seen such a wonderful buy as this Big Mocar aluminum construction model plane! Just think—a real aluminum construction outfit—with 2 1/4 ft. wing spread and 18 in. fuselage—and how it does fly! Many special features, cambered wing construction, the big 11 1/4 in. ball-bearing propeller, with a powerful long-running motor that carries this plane soaring and zooming, won't break up even after many flights.

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AMERICAN MODEL AIRCRAFT CO., Dept. D. 11, New Haven, Conn.

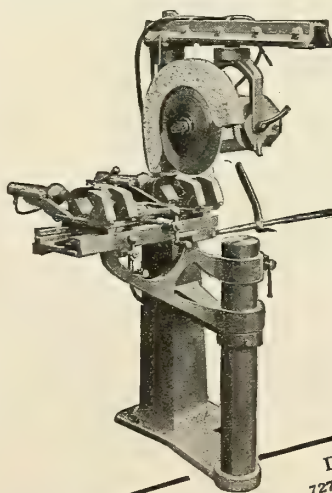


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(Continued from preceding page)

always blow outward from an interior area of calms down the slopes, though deviated always by earth rotation in a direction opposite that of clock motion (see Figure 4). Such a circulation of surface wind implies, of course, an interior area of calm where the air is settling, and such

**STATEMENT OF OWNERSHIP, MANAGEMENT, CIRCULATION, ETC. REQUIRED BY THE ACT OF CONGRESS, AUGUST 24, 1912.**

of AERO DIGEST, published monthly at New York, N. Y., for October 1, 1929.  
County of New York, } ss.  
State of New York, }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Frank A. Tichenor, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the AERO DIGEST, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, The Aeronautical Digest Publishing Corp., 220 West 42nd St., New York, N. Y.; Editor, George F. McLaughlin, 220 West 42nd St., New York, N. Y.; Managing Editor, None; Business Manager, Frank A. Tichenor, 220 West 42nd St., New York, N. Y.

2. That the owners are: The Aeronautical Digest Publishing Corp., 220 West 42nd St., New York, N. Y.; Frank A. Tichenor, 220 West 42nd Street, New York, N. Y.; Jessie E. Horsfall, 220 West 42nd St., New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

(Signed) FRANK A. TICHENOR.

Sworn to and subscribed before me this 30th day of September, 1929.

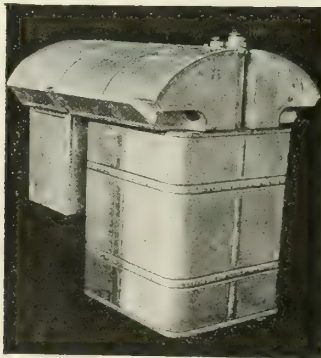
(Signed) ANNA HIGGINS,

Notary Public, New York County Clerk's No. 732.

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calm conditions accompanied by intense cold have been encountered by those explorers who have already crossed the ice-cap in sledge journeys.

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Beyond Iceland it is only 500 miles to the Vaagfjord in the southern Faroes (see Figure 3). These islands stretch out north and south for nearly seventy-five miles and they have many harbors. Vaagfjord, near the southern end of the archipelago, is a fine harbor and is supplied with a radio station, and a whaling station of the Danish government has recently been established there. The following are distances from the Vaagfjord to the northern European capitals: to London, 770 miles over Edinburgh (420); to Paris, 1,000 miles over Edinburgh and London; to Stockholm, 875 miles over Bergen (400), and Oslo (600); to Berlin, 1,000 miles, over the Shetlands (200) and Esbjerg (650); to Copenhagen, 825 miles over the Shetlands (200) and Ekersund (500).

On a plane's arrival at Mt. Evans, a pilot balloon would be sent up to determine how high the aviator should climb in order to reach the tail wind to carry him in to the interior of the continent. On Sunday morning, August 19, 1928, a party from the University of Michigan Expedition was camped on the landing field which had been found at a distance of six miles from Mt. Evans, where they were awaiting the *Greater Rockford* plane with Hassell and Cramer. A field radio station had been set up to report the arrival of the plane at Mt. Evans for transmission to the *New York Times*. A strong wind was blowing down off the ice, but at a moderate height of only 1,500 meters, or 4,500 feet, the wind had already a westerly component to aid the fliers as they would proceed on their course. A little later in the day, the fliers actually reached the Greenland coast where they came out of the fog near the little Eskimo settlement of Fiskenaeset which is just north of the Frederikshaab isblink, (see Figures 2 and 4). After some delay, they were able to find their position upon the map and to fly northward parallel to the ice margin. At first they flew outside the border, but later when they had come over the ice itself they encountered a strong southeast wind which carried them on their course toward Mt. Evans; but, unfortunately, their fuel became exhausted and they were obliged to land upon the ice with Mt. Evans ahead of them less than 100 miles away.

## EFFICIENCY, THE KEYNOTE TO PROGRESS

(Continued from page 56)

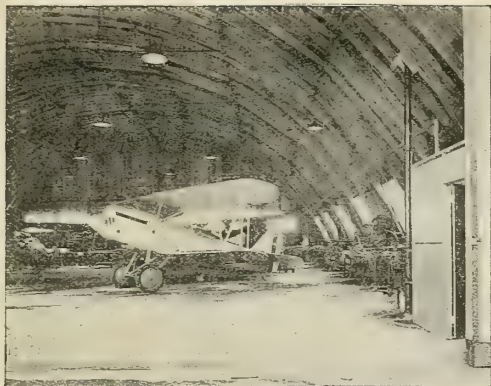
license, and must take off within a distance of 900 feet; and set up three prizes for speed, and three for efficiency as earned on the usual formula:

$$\text{Payload X (Speed)}^3 = \text{figure of merit}$$

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(Continued on next page)



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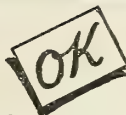
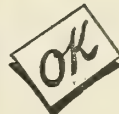
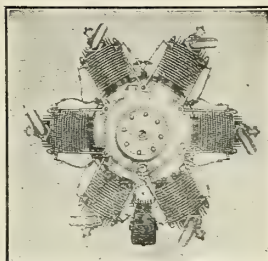
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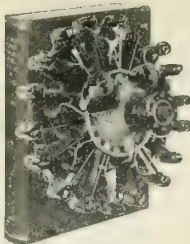
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(Continued from preceding page)

Both sections of the event at Cleveland, for speed and for efficiency, were won by the Bellanca, flown by George Haldeman, chief test pilot of the Bellanca Aircraft Corporation. Haldeman averaged 119.97 miles per hour, and piled up a noteworthy lead in merit points. Speeds were very low because of the semi-darkness and clouds of dust, which made it impossible to see the pylons far enough ahead. The winners were:

Pilot	Airplane	Engine	Pay Load	Speed m.p.h.	Efficiency
Haldeman	Bellanca	J-6	1,390 lbs.	119.9	(1st) 316.0
Smith	Bellanca	J-5	1,125 lbs.	113.7	(3rd) 194.1
Chamberlin	Crescent	J-6	1,120 lbs.	110.1	(2nd) 202.4

Like the Detroit *News* Trophy, the Aviation Town and Country Club Trophy was first competed for at the 1922 races, Selfridge Field. Donated by a group of Detroiters, presented under the title "Aviation Country Club of Detroit Trophy," it was intended as an award for light commercial planes, and was at first subjected to the same confusion as the Detroit *News* Trophy. The first race was flown by three military ships and one commercial plane, the latter a Curtiss Oriole, over a course of 257.74 miles. Lieut. Harold R. Harris took the trophy in his *Honeymoon Express*, a modified DH with a Liberty engine, averaging 134.9 miles per hour. No attention was paid to efficiency.

The very next year, however, the contest was re-defined as a handicap race for commercial planes of high speed not less than 80 miles per hour with engines nor over 750 cubic inches piston displacement, or approximately 200 horsepower. Contestants were required to carry a pilot and two passengers or more. Shortly before the race, piston displacement limits were raised to 770 cubic inches, or 220 horsepower, and the race was divided in two sections for speed and efficiency. For efficiency the following formula was adopted:

$$\frac{\text{Payload}}{\text{horsepower}} \times \text{speed} = \text{figure of merit.}$$

The distance was 155.34 miles, in five laps over a triangular course. As put on at the St. Louis National Air Races in 1923 at Bridgeton, Mo., the "Detroit Aviation Country Club Trophy" contest was perhaps the first intelligently conducted national efficiency contest.

Both sections were won by a Bellanca cabin monoplane, Jack Atkinson up, carrying a weight equivalent to four passengers. The winning plane consumed 35 gallons of fuel, 4½ gallons of oil, and made an average time of 94.28 miles per hour. An aeronautical magazine of the day published the comment: "It was the first race in which streamlining played an important part. Because Bellanca foresaw this need and constructed an airplane as a unit instead of streamlining each separate part, his plane won the race." Seven planes started in this contest, and three finished as follows:

Pilot	Airplane	Engine	Speed m.p.h.	Efficiency
Atkinson	Bellanca	Anzani	94.2	(1st) 674.8
Hutton	Laird	Curtiss	87.0	(2nd) 300.4
Jones	Curtiss Oriole	Curtiss	82.6	(3rd) 285.5

This race was flown again in 1924, at Dayton, under unfavorable weather conditions. The winning plane of 1923, flown this year by Harold Hartney, was disqualified for fouling a pylon. The speed section was won by Basil Rowe, flying an SVA at an average speed of 111.4 miles per hour, J. C. Ray in a Curtiss Oriole second (at 107.5 miles per hour), and W. L. Stultz in an Atlantic S3 third

(Continued on next page)



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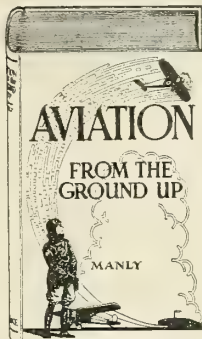
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## NAVIGATION

E SCHOOL

Buffalo, N. Y.

(Continued from preceding page)

(at 106.93 miles per hour); while the efficiency section was led by Walter Beach in a Swallow (430 merit points), Cy Caldwell in a Martin, second (388 merit points); and Basil Rowe, third in his SVA (245 merit points).

In 1925, at Mitchel Field, the event was re-named, and has since been known as the Aviation Town and Country Club Trophy race for speed and efficiency. Engines of 800 cubic inches piston displacement were admitted, and the course was laid over 100 miles. There were fourteen entrants, and nine of these finished. In the efficiency section, contestants were required to take off over a barrier within 700 feet; a second test reduced this distance to 600 feet. Published comment on the Mitchel Field event stressed the ascendancy of the commercial airplanes entered, pointing out the advances made in commercial types for streamlining, maneuverability, and engine performance. Increases in both speed and efficiency, according to the critics of the day, were due chiefly to better aerodynamic features of airplane design and to a lesser degree to engine design. The speed section was won by a Curtiss Oriole, Casey Jones up, at an average speed of 128.4 miles per hour. The efficiency section was again led by a Bellanca cabin monoplane, flown by Fred Becker, with a margin of 202.7 merit points over his nearest rival. Results were as follows:

Pilot	Airplane	Engine	Speed m.p.h.	Efficiency
Jones	Curtiss Oriole	Curtiss	128.4	(2nd) 394.8
Rowe	SVA Aeromarine	V8D	119.8	
Becker	Bellanca	Wright J-4	112	(1st) 597.5
Andrews	Curtiss Lark	Curtiss	106.7	(5th) 308
Moltrup	Oriole	Curtiss	105.8	
McMullen	Curtiss Oriole	Curtiss	103.8	(4th) 318.4
Depew	Sikorsky		93.2	(3rd) 329.9

The winner of the Detroit *News* Trophy in 1926, at Philadelphia, also won the efficiency section of the Aviation Town and Country Club Trophy race at that session of the National Air Races, and the speed section of the *News* trophy race was taken by J. G. Ray in a Pitcairn at a speed of 136.37 miles per hour average. The regulations of the contest, which had come to be looked upon as the outstanding efficiency competition limited to civilian planes, remained almost unchanged, though it was flown over a course of 96 miles. However, a new feature of indicative value was introduced in the form of a required safety factor defining a wing cellule to be 4 low incidence condition and 6 high incidence condition. On the other hand, load consisted only of pilot and 170 pounds ballast. In short, as evidenced in the published comment on this race, aeronautical, as well as public, interest was still reluctant to turn its attention from speed to efficiency. This condition prevailed despite the fact that Lieut. Champion, pilot of the efficiency-winning Bellanca monoplane, turned up a lead of 241.2 merit points in an airplane which was still essentially of 1922 design and which had been taking efficiency prizes every year with disconcerting regularity. The results at Philadelphia were:

Pilot	Airplane	Engine	Speed m.p.h.	Efficiency
Ray	Pitcairn	Curtiss	136.3	(4th) 328.7
Jones	Curtiss Oriole	Curtiss	135	(5th) 325
Beach	Travel Air	Wright J-4	127.2	(3rd) 426.9
Champion	Bellanca	Wright J-4	121.3	(1st) 678.5
Carroll	Vought	Wright J-5	121	
Faulkner	Fleetwing		100.3	(2nd) 437.3

Like the 1924 contest, the Aviation Town and Country Club Trophy race of 1927, at Spokane, excited little interest, and its results compared closely with those of the Detroit *News* Trophy at the National Air Races that year.

(Continued on next page)

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(Continued from preceding page)

The speed mark first set for this event by Lieut. Harris in 1922, which had been boosted in 1926 by Jim Ray's Pitcairn, was again raised to 138.39 miles per hour by the same plane and pilot. The results:

Pilot	Airplane	Speed m.p.h.	Efficiency
J. G. Ray.....	Pitcairn .....	138.39	(2nd) 331.07
J. H. Miller.....	Hamilton.....	99.09	(1st) 528.4
Paul Richter.....	Fokker.....	95.39	(3rd) 329.03

In 1928 at Los Angeles, however, the speed section of the race showed results which indicated a falling off of interest; whereas the winner of the efficiency section established a significant gain of 268.61 merit points over the second place contestant. The take-off distance was again set at 600 feet, with the result that the two contestants with highest speed showings were disqualified for failure to take off within bounds. Awards therefore came down to two planes:

<i>Pilot</i>	<i>Airplane</i>	<i>Engine</i>	<i>Speed m.p.h.</i>	<i>Disp. Load</i>	<i>Efficiency</i>
Meister...	Buhl.....	Whirlwind J-5	116.74	609 lbs.	(2nd) 360.8
Dallin....	Bellanca..	Whirlwind J-5	104.65	1,185 lbs.	(1st) 629.4

The 1929 National Air Races, as previously stated, were strong in efficiency contests. Besides the old-line trophies, an event was put on for light airplanes, and the new Federal Tire & Rubber Co. Trophy was offered for efficiency in a race which was flown as a derby between Cleveland and Buffalo for merit points derived on the same formula as used in the efficiency classics. The three major efficiency trophies again went to Bellanca monoplanes on their figure of merit standings, though the speed section of the Aviation Town and Country Club Trophy event was won at an average of 133.75 miles per hour by Errett Williams in an Eaglerock. First three places were awarded as follows:

For Speed			
Pilot	Airplane	Engine	Speed
E. Williams	Eaglerock	Wright J-6	133.75 m.p.h.
V. L. Roberts	Monocoach	Warner	129.43 m.p.h.
R. T. Quinby	Monocoupe	Warner	125.57 m.p.h.

For Efficiency				Merit
Pilot	Airplane	Engine	Payload	Points
J. W. Smith	Bellanca	Wright J-5	1,121 lbs.	253.19
C. D. Bowyer	Cessna	Comet	305 lbs.	141.31
R. T. Quinby	Monocoupe	Warner	224.5 lbs.	118.40

A summing up of the foregoing contest results brings to light some rather interesting facts.

In the annual competition for the Detroit News Trophy beginning 1922, four years of racing were required to free the event from the domination of Government craft and open it to commercial builders. In the four contests since 1925, the interest in speed has clearly and more or less steadily given place to a rising interest in efficiency. With the Aviation Club Trophy, only the first competition was won by service craft. Seven years of racing for this celebrated prize should have provided a definite stimulus to the development of commercial airplane efficiency, but the most we may conclude is that this event also has awakened some public and aeronautic interest in competitive efficiency, without greatly affecting the promotion of fundamental design.

Yet if some commentators have considered speed the paramount issue of these trophy races, the results must be admittedly disappointing. The highest average speed

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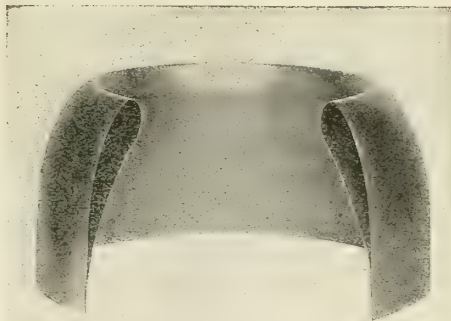
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## COMPUTATION FOR LOAD FACTOR

(Continued from page 72)

SMALL AIRPLANES: GROSS WEIGHT LESS THAN  
5,000 POUNDS

$$F = \frac{12,000 - W}{75,000} (65 - W/HP) + 0.8$$

If  $W$  is less than 2,500 pounds, insert  $W = 2,500$  pounds.If  $W/HP$  is less than 20 pounds per horsepower, insert  
20 lbs./HPLARGE AIRPLANES: GROSS WEIGHT GREATER THAN  
5,000 POUNDS

$$F = \frac{36,111 - W}{333,333} (36.666 - W/HP) + 3.444$$

If  $W$  is greater than 25,000 pounds, insert  $W = 25,000$ If  $W/HP$  is less than 20 pounds per horsepower, insert  
20 lbs./HP

In order to prove the mathematical identity between the above formulae and Figure 1, consider the gross weight  $W$  constant. The remaining relation between the load factor and the power loading appears then to be linear, which shows that the lines representing the two formulae in a diagram similar to Figure 1 will be straight lines. This is the first requirement. The formulae are further linear in  $W/HP$  and in  $F$ , indicating that the different straight lines for  $W$  follow the rules for a linear interpolation. It remains, then, only to show that the straight lines resulting

from the formulae are really the same ones as in Figure 1; in other words, it remains to show that the constants are correctly determined. This can be done only by inserting special values and by comparing the numerical results. In particular,  $W$  can be inserted as  $W$  25,000, 5,000 and 2,500 pounds in combination with a power loading of 5 and 20 pounds per horsepower. The result coincides exactly with the values of Figure 1. Also, the two formulae for small and large airplanes become equal if  $W = 5,000$  lbs. is inserted, exactly as in Figure 1.

The above formulae have been used to advantage in the engineering department of the Alexander Industries, and it is therefore believed that they will also be appreciated in other places. Besides saving time and giving more exact results, their use makes it easier for the engineer to get a good hold of the relation represented. This is important for instance if such a problem as this arises: The airplane weight exceeds the estimate by 20 pounds and there is no margin of safety left. How much does the pay load have to be reduced? Not 20 pounds. Perhaps not at all if the excess weight is in the wings; less than 20 pounds if the excess weight is in the fuselage, because somewhere between the estimated weight and the actual weight there is a point where the excess load is balanced by the increase of the load factor due to the increased power loading. The formulae given in this article can be used to good advantage to determine what fraction of small excess weights is allowed under the Department of Commerce rules, in each special case. This cannot be conveniently done by the direct use of Figure 1.

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**YOUNG MAN,** 10 years' experience on automobiles wishes position in aeronautical motor factory near New York. P. Cane, 1575 West 11th Street, Brooklyn, N. Y.

**LICENSED** airplane and engine mechanic and parachute rigger. Graduate of Air Corps Technical School, crew chief's and parachute riggers' courses. Go anywhere. F. M. Cuplin, 1022 Ave H., Crowley, La.

**TRANSPORT PILOT,** war flier, 2000 hours, desires connection with a responsible concern or private owner. Single, unattached, will go any state or country. References as to flying ability and character. Please give full details in first letter. AERO DIGEST, Box 882.

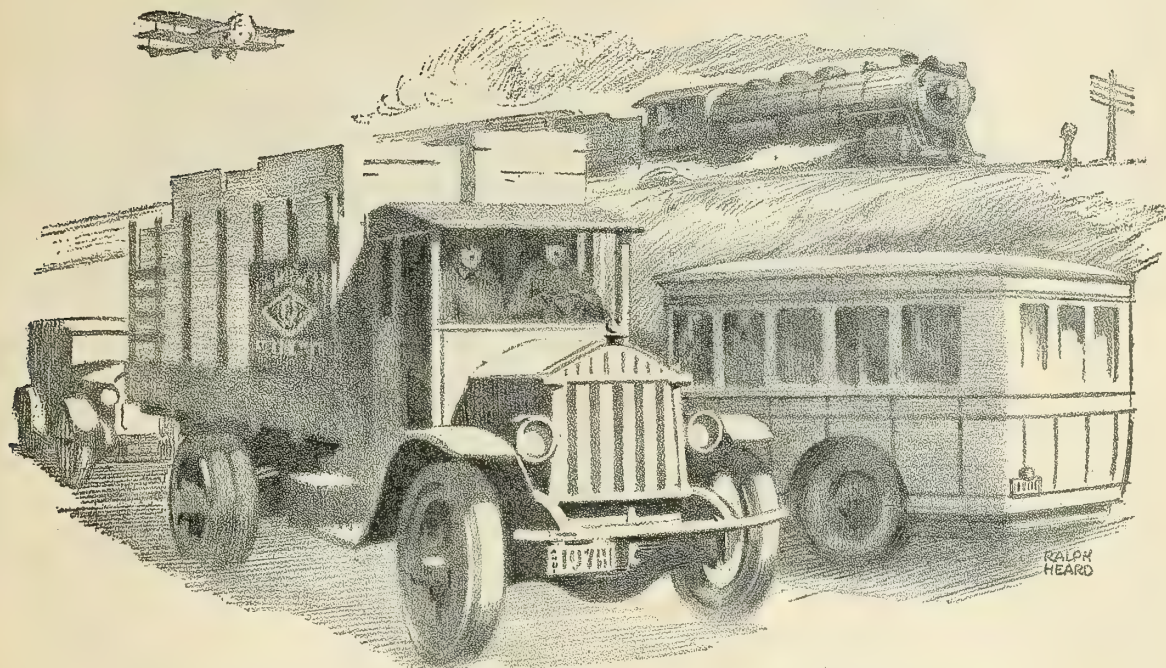
**LIMITED COMMERCIAL PILOT,** age 23. Will go anywhere. Experienced on Swallow, Command-Aire, Travel-Air. References furnished. Wallace Webster, 6228 Blackstone Ave., Chicago, Ill.

Over two hundred hours Jennys and new production. Eligible for transport license. Prefers position as co-pilot on transport line. Married. AERO DIGEST, Box No. 877.

**TRANSPORT PILOT** with 475 hours, 125 hours on seaplane, wishes position with reliable concern. Will consider anything but barnstorming. Box 527, La Crosse, Wis.

Say you saw it in AERO DIGEST





## Transportation and Grinding

**G**REAT engines of commerce owe much to the lightness, strength and toughness of modern alloys.

America boasts of aeroplane motors that generate the maximum horse power per pound of weight.

In the building of gasoline motors and steam locomotives, grinding works to accuracy limits around one-quarter of a thousandth of an inch and sometimes even nearer absolute perfection. The result is: tremendous power, high speed, dependability and safety.

The practical use of hard, tough alloys, the accuracy of today and economy of manufacture, came after the invention and development of modern abrasives, modern grinding wheels and grinding machines—after grinding became a factor in machining operations. It would have been exceedingly costly, if at all possible to reach the present day degree of motor accuracy before grinding took its place in the machine shops.

Great industries have been successful because of many contributing factors, not the least of which is grinding. This is exemplified by the revolution in means of transportation, timed within the era of the development of the modern process of grinding.

NORTON COMPANY . . . WORCESTER, MASSACHUSETTS

# NORTON

Grinding Wheels  
Grinding Machines



Refractories-Floor  
and Stair Tiles





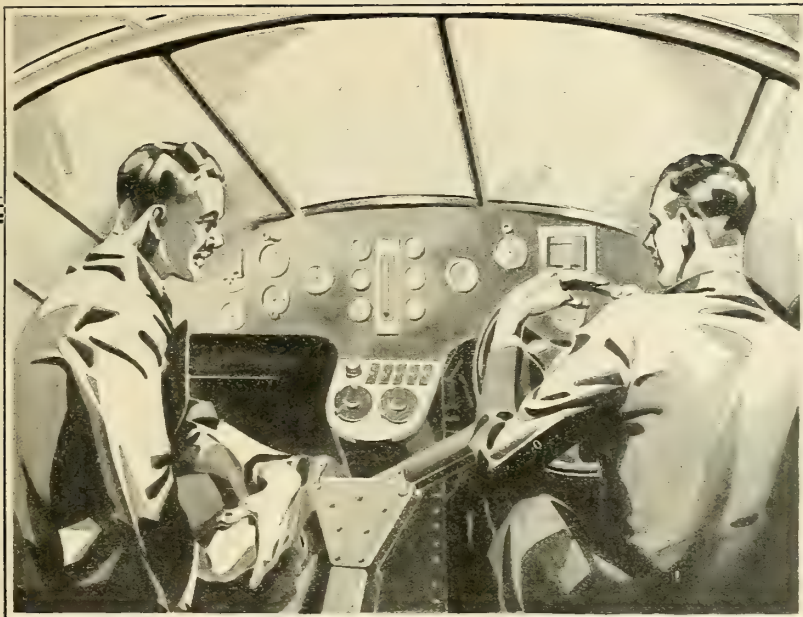
## Bates paid me the finest compliment I've ever had

Bates flies because he's keen about it, and because it saves him good business days every month. When he asked me to go to Boston with him in his Sikorsky Amphibion I broke three dates to do it.

We slid into one of the most comfortable pilot's cockpits I've ever sat in. Roomy. And you can adjust the seat to suit yourself. The engines were warm and Bates picked her off the water with scarcely any run at all. I noticed she climbed fast, and very easily. Bates circled the Bay and put her on her course.

And then . . .





## He passed me the wheel of his Sikorsky Amphibion

Bates glanced at me and swung the control wheel over into my hands.

I seldom fly large ships, and I thought of the "S-38" as something a bit difficult to handle. I got the surprise of my life. She controls easily and naturally and is absolutely alive with reserve capacity to do all you ask of her. When I set her down in Boston Harbor, Bates smiled approvingly.

You can guess how much Bates thinks of that ship. She'll do more than 125 miles an hour, climb to 18,000 feet, and fly and maneuver on either engine. His passing over the controls was the finest compliment I've ever had.

SIKORSKY  
AVIATION CORPORATION

Bridgeport, Connecticut

DIVISION OF UNITED AIRCRAFT & TRANSPORT CORPORATION



BY NICHOLAS-BEAZLEY AIRPLANE COMPANY, INC.



The Barling NB-3 is the safest light airplane. Superior engineering gives unexcelled stability and ease in handling. It flies hands off—almost continuously if desired.

It automatically rights itself in flight from any position—in any maneuver—upon release of the controls.

Non-spinning—will not fall into a spin from any stall position. Although many expert pilots have tried, no one has been able to force it into and hold it in a continuous spin. Vision—is the maximum, as perfect and complete as can be devised in a plane.

Slow landing, quick take-off and rapid climb for restricted landings—excelling most planes with twice the power.

Full cantilever wing—not divided at the fuselage—unbreakable—no external wires, struts or bracing to loosen, break or adjust. A thick metal wing below the fuselage to protect the occupants in a severe landing.

Center of gravity—lowest of any design. Easier to taxi, better control in cross wind, prevents nose overs.

The only low wing metal airplane—with many exclusive engineering advantages—and a wing loading of only 8.6 pounds per square foot.

Metal uniform in strength—avoids the irregularities and uncertain resistance of wood. Bends or deforms in case of accident instead of splintering and breaking.

All parts are uniform—standardized, pressed or stamped with special machinery and dies eliminating the hazards of hand labor.

Assembling is done to jigs and fixtures insuring uniformity and full protection of every factor of safety.

NICHOLAS-BEAZLEY AIRPLANE COMPANY, Inc.,  
MANUFACTURING DIVISION—MARSHALL, MISSOURI

The most saleable and desirable small plane sales agency account.

A plane with originality, distinctiveness, many exclusive features and outstanding performance.

The lowest priced per person of any size or type of plane available.

The lowest maintenance cost of any three-place plane.

Sales territory is being contracted.

# BARLING NB 3

## Monoplane

This WACO "225" Straight-Wing won the Fifth National Air Tour with a perfect score for every lap. If you'd like further information regarding the ship and the Tour, send for the two interesting booklets which give full details.



9-41

# What it means to you... *that WACO won the National Air Tour two years in succession*

**T**O win the National Air Tour, a ship must do five things better than any other ship . . . and do them consistently. And WACO did this in 1928 and again in 1929 . . . winning by a wide margin of points.

What are these five things that determine the victor in this event? They are the points of a formula that decides a ship's all-around performance . . . a formula agreed upon by the Contest Committee of the National Aeronautic Association as being fair and impartial to all entries.

Without becoming involved in the technicalities of the formula, these are the factors that go to make it up;

**1. Useful Load**—The greater the useful load a ship can carry, the higher its figure of merit becomes . . . for obvious reasons.

**2. Speed**—The faster a ship can travel with full load, the higher its figure of merit . . . because its practical utility is thereby improved.

**3. Landing Time**—The shorter the distance in which a ship comes to a dead stop, the higher its figure of merit . . . because its capability in emergency landings is greater.

**4. Take-Off Time**—The quicker a ship leaves the

ground, the higher its figure of merit . . . because of its greater ability to get out of small fields.

**5. Power**—The less power a ship requires to make it thoroughly airworthy and practical, the higher its figure of merit . . . because its operation is more economical.

These are the points by which you, yourself, judge a ship. And WACO's ability to meet them is proved not only by winning the National Air Tour two years in succession, but also by the number of people who buy WACOs in preference to other ships. There are more WACOs in commercial service than any other make.

✱   ✱   ✱

## *Here are the official figures for the winning WACO*

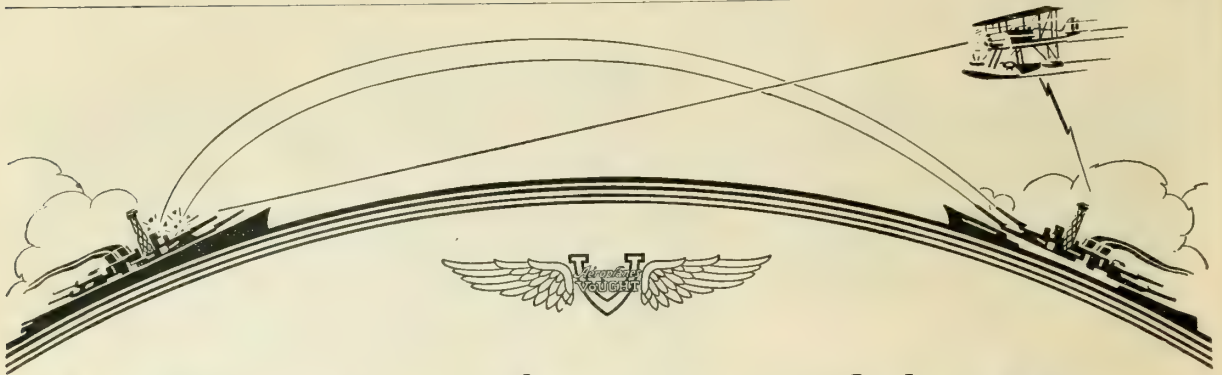
With Department of Commerce type certificate load of 972 pounds . . . with average top speed of 135.4 m.p.h. clocked four times over a measured course . . . with the astonishing time of 3.4 seconds to dead stop in landing . . . with correspondingly abrupt take-off time of 4.4 seconds . . . and powered by the Wright J-6, 7-cylinder, 225 H. P. motor . . . WACO was awarded the highest figure of merit of all competing entries, regardless of size, type, or price.

THE WACO AIRCRAFT COMPANY, TROY, OHIO

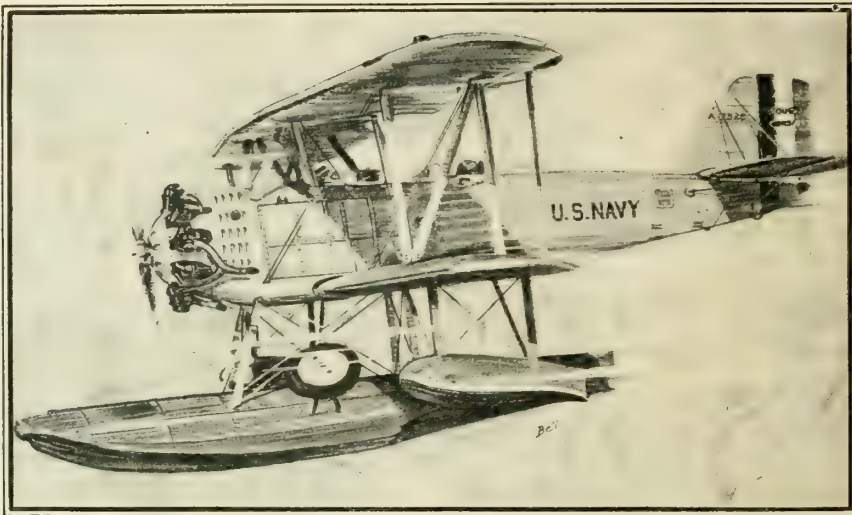


"ASK ANY PILOT"





# The "Corsair"...the eyes of the Navy



The "Corsair" with its 425 H.P. "Wasp" engine adapted as a high performance amphibion for the aircraft carriers of the Navy

**M**ODERN problems in naval gunfire involve tremendous ranges. As the standardized observation plane of the Navy the "Corsair" has enabled spotters to increase their vision far beyond that afforded from the "tops." It has proved its worth with thousands of hours of satisfactory service.

The utility of the "Corsair" has been further extended by the addition of amphibion gear. Thus equipped it can be launched

from a battleship catapult, landed on the deck of a carrier, on the sea or at a shore station.

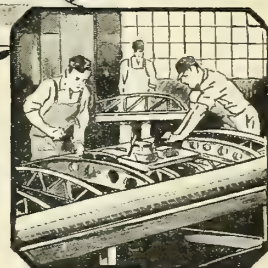
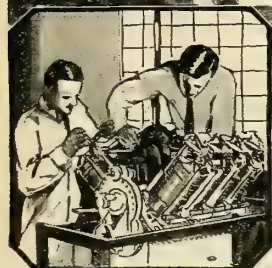
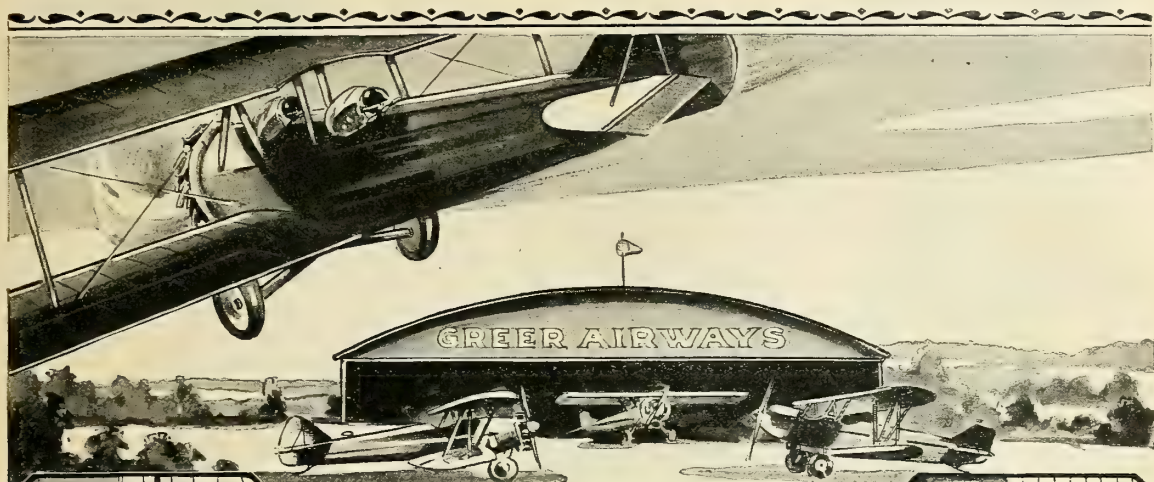
The strains set up by catapult launching and quick stopping aboard a carrier require safety factors far in excess of those used on any other type of ship. When the "Corsair" goes into civil life for sports or business use it provides the same margins of performance and dependability which characterize its naval and military operation.

## CHANCE VOUGHT CORPORATION

DIVISION OF UNITED AIRCRAFT & TRANSPORT CORPORATION

Long Island City, New York

Say you saw it in AERO DIGEST



## Continued Leadership— AFTER 27 YEARS OF SUCCESS!

**Naturally, the Greer Aviation Student Has the Greater Advantages!**

**Y**OUR success in Aviation depends upon the experience of the School which gives you your first training.

Experience, prestige and success come only to those who have themselves learned what to do—and how to do it—correctly. These qualities cannot be acquired in one year or five years, yes, even ten years. It takes a lifetime of study and effort!

Only Greer College can offer you the experience of 27 years of active, successful training methods.

Only Greer College can offer you the equipment a thorough training demands—12 floors of machinery,

motors, classrooms, assembly shops, and materials. Of course, training planes and flight instructors are licensed by the Government.

Only Greer College needs to make use of three Airports within the boundaries of Chicago.

Only Greer Students have the advantages that Chicago, the "Air Capital of the United States," can give them—the world-famous Municipal Airport, about which are grouped the hangars of every famous transport company in the East and Mid-West—endless varieties of industries are here, both in the field of Aviation and out of it. Here, if anywhere, are the greatest opportunities for the graduate.

You clear visioned, ambitious and air minded young men deserve the best advantages a training school can offer you. Obviously, the Greer Student has the greater advantages.

*Before you turn this page, clip the coupon in the lower right hand corner and send for your copy of "Winning Your Wings," the true story of a dependable school of Aviation!*

(Inspection and Rating by U. S. Dept. of Commerce Applied for.)

### Special Advantages!

Railroad or bus fare allowed to Chicago to students who pay for their courses in advance.

**FREE EMPLOYMENT SERVICE**—Help to all Greer Students during their training period.

## Greer College

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Dept. 12K

CHICAGO

### One of These Greer Aviation Courses Will Meet Your Demands!

#### Pilot's Ground Course

This course is intended for those who wish a thorough training in the first principles of flying, with the intention to fly as soon as possible.

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This is the most complete course in ground work offered by any school, meeting Government standard.

#### Pre-Solo and Private Pilot's Course

This course is the first step toward a Government License and includes 10 hours dual flying if necessary, and 10 hours solo. These courses can be taken separately.

#### Limited Commercial or Industrial Pilot's Course

This is the next step forward to a more valuable Government License. 50 hours of solo and necessary dual flying.

#### Transport Pilot's Course

This is the course which will prepare you to receive a Government Transport Pilot's License, upon passing an examination. 200 hours of advanced flying under all kinds of conditions.

### MAIL THIS COUPON—TODAY

GREER COLLEGE, Dept. 12K  
2024 S. Wabash Ave., Chicago, Ill.

Please send me free your big Aviation book and full details about your Training and Employment Service.

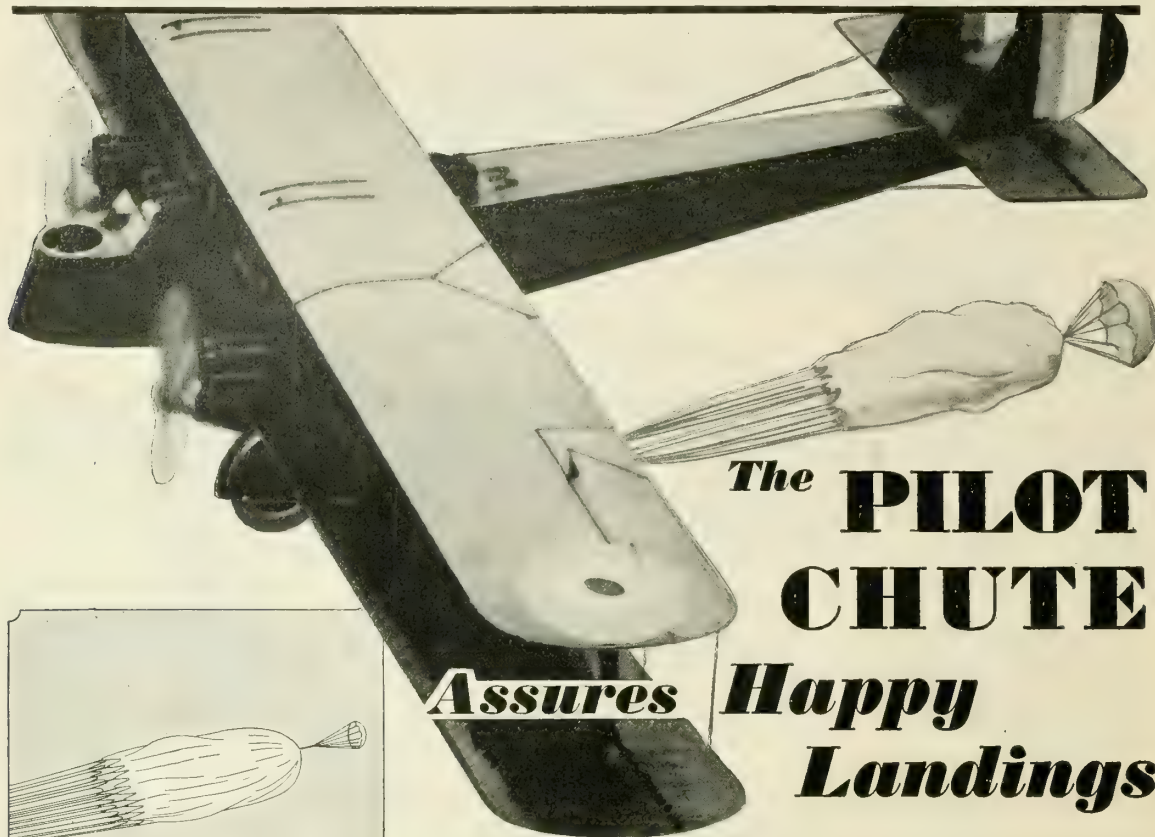
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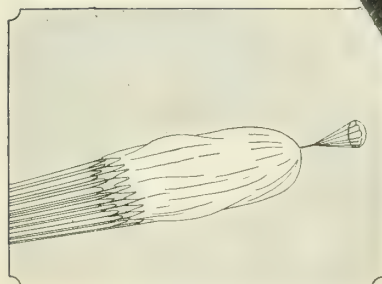
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Age.....Occupation.....

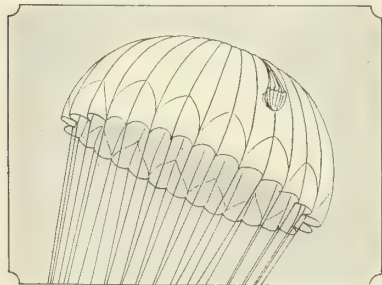




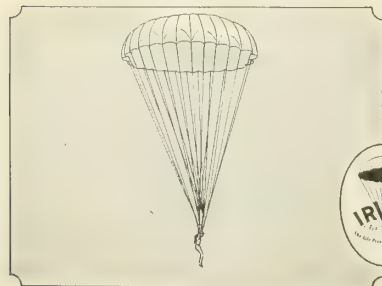
# The **PILOT CHUTE** **Assures Happy Landings**



*As soon as the pack opens, the pilot pulls out the parachute.*



*Once the parachute fills, the pilot chute has done its work...*



*And you glide gently to earth for a Happy Landing!*

THE pilot chute of an Irvin snaps the parachute out of its pack in record time because this miniature chute is ribbed with spring steel and packed under tension. You jerk the pull ring... it springs out quickly... the big chute fills with air, and you are in flight... gliding gently to earth.

The Irvin Air Chute is available in seat, lap or back pack types. All Irvins are identical in construction and are made in two grades of fine silk, one priced at \$350, the other at \$290. Every one, regardless of price, complies with the standard U. S. Government parachute drawings.

Irvin Air Chutes are available in all sections of the country.

Among the important distributors are Curtiss Flying Service, Inc., The National Flying Schools, Air Associates, Inc., and Nicholas-Beazley Airplane Co.

Dealers who are interested should communicate directly with the company. If there are no dealers near you, write to us and we will arrange the most convenient way to supply your needs.

## IRVIN *The Life Preserver of the AIR*

IRVING AIR CHUTE CO., INC., 372 PEARL STREET, BUFFALO, N. Y.

*Irving Air Chutes Are Obtainable At All S-A-T Service Depots*

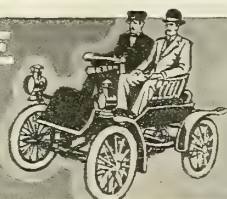
Our Motion Picture "Happy Landings" on standard width film, illustrating actual operation of the Irvin Air Chute is available free of charge to schools, clubs and organizations interested in aviation. Send for booklet and particulars.

# An ERA of GREATER PROFITS/

## BIRD PLANES



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BICYCLE



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UNLIKE the bicycle dealer of a generation ago who had to be trained in the mysteries of ignition, brakes, and motors in order to handle motor cars, the automobile dealer is already equipped to enter this last and most profitable transportation era.

Aviation is the logical extension of the automobile dealer. His sales force is capable of presenting the plane to a motorwise public, and his mechanics are best fitted for service.

The same opportunity which was offered to the bicycle shop yesterday is offered to you today.

Automobile dealers with vision will appreciate the possibilities of greater profit to be had in selling BIRDS.

Ever since the first BIRD took the air it has held the standard for safety. Its internal construction, its wing design, its inherent stability—every item of its design and assembly assure its leadership in the popular priced class. It is ideal for training, sports, or transport. Its price, performance, and safety factor make it the fastest selling of all planes, and our franchise assures the greatest profit to the dealer selling them.

Write today for details of franchise in your territory.

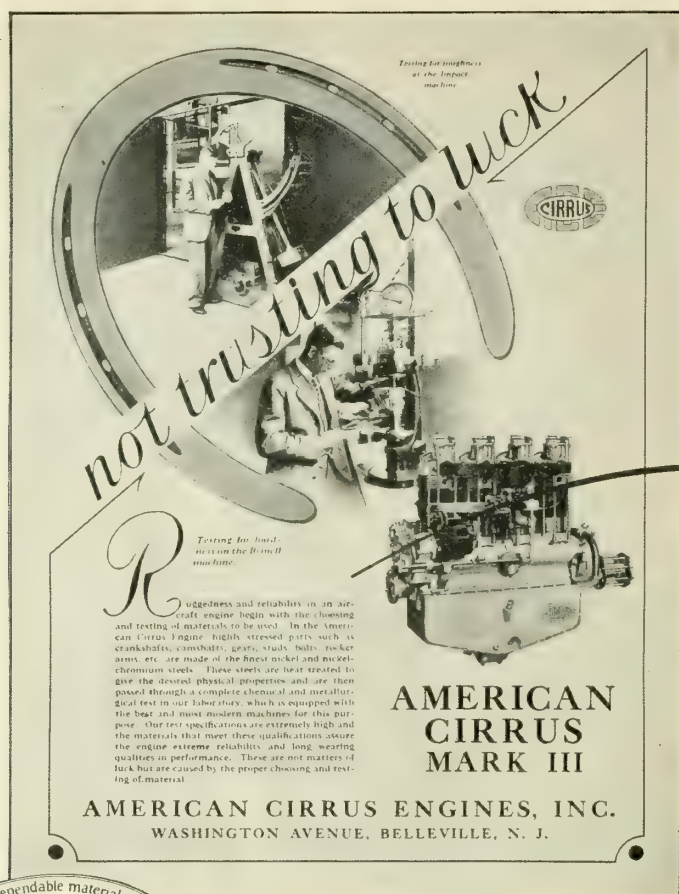
BRUNNER-WINKLE AIRCRAFT CORPORATION

17 Haverkamp Street, Brooklyn, N. Y.



*Safety with Performance*





Testing for toughness at the impact machine.

*not trusting to luck*

Testing for toughness on the Brinell machine.

**AMERICAN CIRRUS MARK III**

Dependable materials are the best assurance of dependable performance.

AMERICAN CIRRUS ENGINES, INC.  
WASHINGTON AVENUE, BELLEVILLE, N. J.

**Why...**

**Nickel Alloy Steel**  
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**American Cirrus**  
airplane engines

"HIGHLY stressed parts such as crankshafts, gears, studs, bolts, rocker arms, etc... made of the finest Nickel and Nickel Chromium Steels...assure the engine extreme reliability and long wearing qualities"...

This is one of the principal reasons the makers of the famous American Cirrus airplane engines give for using dependable Nickel Alloy Steels for vital parts. Because of the uniformly dependable mechanical properties of Nickel Alloy Steels, practically all leading manufacturers of airplane engines, both in America and Europe, have adopted these steels for highly stressed parts, the weight of which must be pared to a minimum.

SEND FOR "BUYERS' GUIDE TO NICKEL ALLOY STEEL PRODUCTS"

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FOR ALLOY STEEL



THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.



# Bennett Airways' Students Prefer Lincoln PT - - - - -

Bennett Airways, Inc.



October 19, 1929.

Mr. L. C. Perkins,  
Salesmanager, Lincoln Aircraft Co.,  
Lincoln, Nebraska.

Dear Mr. Perkins:

You are entitled to an expression from us of our reaction on the training planes we recently purchased from you. As you know, we have had one of these planes about two weeks, and the other four or five days. Our students are very eagerly looking forward to delivery of the other eight.

We have approximately eighty students, and I am besieged with requests of students to be assigned to one of the Lincoln Trainers. I am telling you very frankly that our pilots and the students upon whom I rely for evidence as to the efficiency of your ships are unanimous in their approval of your training planes. They think it is really "hot stuff", and we are delivering a lot of hours on them.

Your factory is to be congratulated on this plane, which appears to me to be a sensation. With all good wishes for your continued success.

Yours very truly,

BENNETT AIRWAYS, INC.

By *Howard Red*  
General Manager

NHER:JP

**ONLY** a few months on the market.

And already the LINCOLN PT is winning favor with flying schools. That's because this marvelous aircraft is the most practical training plane made.

Rugged in strength . . . it's hard to damage! Low in cost and upkeep . . .

it's unusually economical! Inherent in stability . . . it recovers from spins without effort!

The LINCOLN PT is the coming plane for flying schools. Know all about it. Mail coupon for *free* complete literature today!

LINCOLN AIRCRAFT CO., Inc.; Victor H. Roos, Pres. and Gen'l. Mgr.; Lincoln Nebr.

## LINCOLN PT.

*A Two-Place Plane for Training, Sport or Business  
Carries Approved Type Certificate No. 181, Dept. of Commerce*

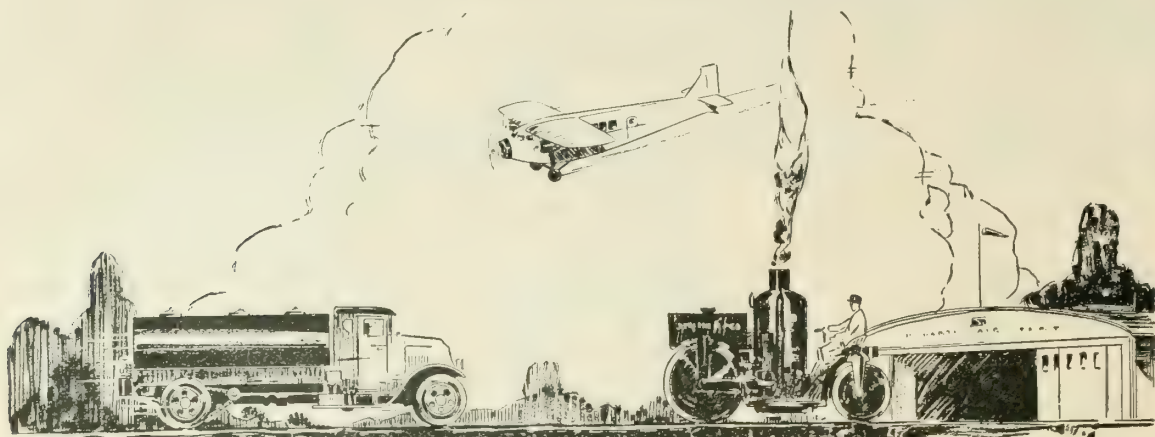
### MAIL COUPON NOW

Victor H. Roos,  
Lincoln Aircraft Co., Inc.  
Lincoln, Nebr.

Dear Sir: Please send me free complete literature about the remarkable LINCOLN PT.

Name .....  
Firm .....  
Address .....





# 3 times tested: by trucks— by rollers—by landing planes

**W**HETHER it must withstand the slow crushing loads of heavily loaded trucks or weighty rollers—or the terrific impacts of great passenger planes—Armco Perforated Pipe stands up.

The fact that the rock back-fill above absorbs little of the blow is of no consequence. Armco Perforated Pipe is built for just such strains—which explain its success in this field and its rapidly growing popular-

ity with pilots as well as with operators and managers.

Ask us about the service Armco Perforated Pipe is rendering airports today. Get its record of *adequate* drainage which eliminates "soft spots"—of dependable drainage which requires no repairs or replacements.

Give us your conditions—your difficulties. Our engineers will be glad to make suggestions—without cost or obligation.

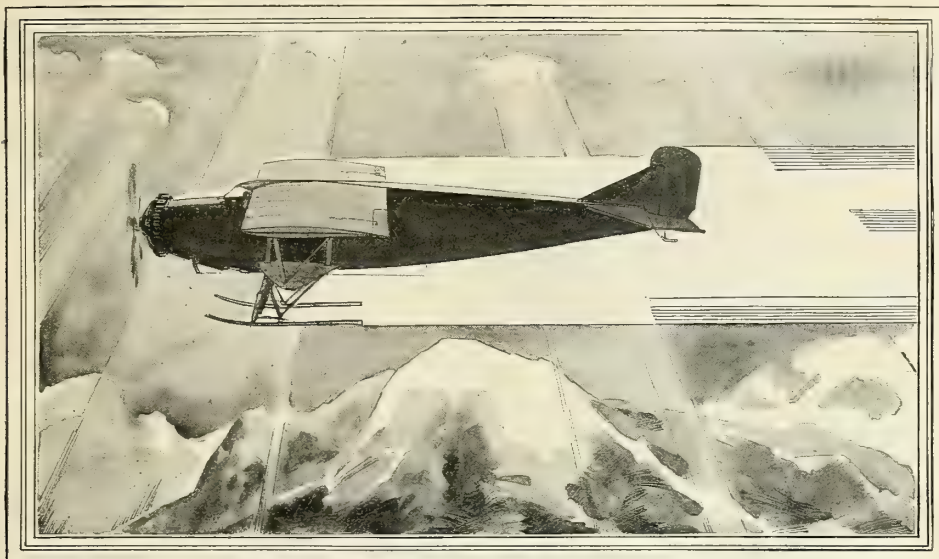
## ARMCO perforated PIPE

ARMCO CULVERT  
MANUFACTURERS  
ASSOCIATION  
Middletown, Ohio

Armco culverts and drains  
are manufactured from the  
Armco Ingot Iron of The  
American Rolling Mill Com-  
pany and always bear its brand



**ARMCO Use flexible pipe-it cannot break ARMCO**

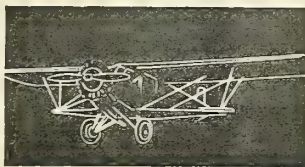


# Buhl Airsedan No. CA-6-41\*

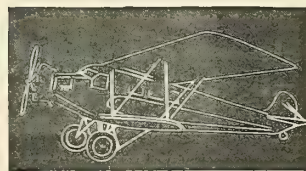
## "Doubles in Brass"



The Buhl Senior Airsedan is an eight-place dual control plane, powered with a Wright Cyclone engine.



The Buhl Sport Airsedan is a three-place plane with dual dep controls powered with either the J-5 or J-6 Wright Whirlwind engine.



The Buhl Standard Airsedan is a six-place, dual control plane, powered with the new J-6 Wright Whirlwind engine.

**T**HAT'S an old expression of the circus lots. The chap who leads the elephants in the parade, does his stuff on the flying rings, then toots industriously in the Silver Cornet Band . . . that chap, they say, "doubles in brass." So does this Buhl Standard Airsedan. It has more jobs . . . and more varied jobs . . . than the most versatile jack of all trades. Passengers or perfumes . . . hairnets or hay . . . mail or macaroni . . . regular trip or special run . . . it's all in the

\* All Buhl Airsedans are given a code number on leaving the factory. Their records are carefully tabulated and are open to your inspection at any time. Proven performance is the finest testimonial to superiority.

**BUHL** AIRCRAFT COMPANY  
MARYSVILLE, MICH.



day's work. Clear, snow, or flood . . . the Canadian Northwest is no respecter of persons or of planes . . . she goes through on schedule. She's not only built to perform

under any conditions, but is specially equipped to do so . . . standard landing gear for normal use . . . skis for the long, hard winter . . . pontoons when mountains and forests make lakes the only landing fields. Surely such constant, dependable service implies unsurpassed design and craftsmanship.

### MAIL THIS COUPON

BUHL AIRCRAFT COMPANY, Marysville, Mich.  
Gentlemen: Please send me, free of charge, your booklet "Above the Clouds."

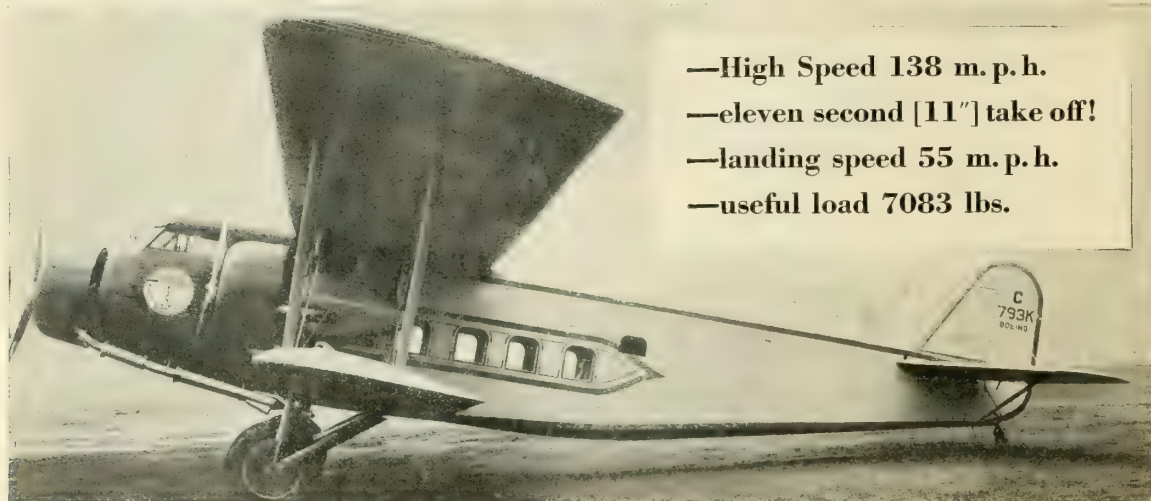
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Address

City & State



# PERFORMANCE COUNTS!



- High Speed 138 m. p. h.
- eleven second [11"] take off!
- landing speed 55 m. p. h.
- useful load 7083 lbs.

## THE NEW BOEING MODEL 80-A TRI-MOTORED PASSENGER TRANSPORT

BOEING engineers designed Model 80-A to fly on Boeing routes—*not merely an airplane to sell!* Its specifications were based on two years' flying data gathered on the Boeing-operated Chicago to Oakland route . . .

A fleet of Model 80-A's are now operating on this "*longest air line in the world*". . . flying rigid schedules . . . sea level to 12,000 feet . . .

some airports 6,800 feet altitude . . . ground temperatures from 30 below zero to 120° Fahrenheit! Tests with full load have proven this transport *swift, highly maneuverable, economical* to operate and *comfortable* to ride in! It is the outstanding plane in its field.

Model 80-A is now offered to the domestic and foreign market. Complete information will be sent upon request.

## BOEING AIRPLANE COMPANY

*Division of United Aircraft & Transport Corporation*  
SEATTLE, WASHINGTON

### \* PERFORMANCE

(Boeing Model 80-A with full load)

**Speed:** High speed 138 m. p. h.; cruising speed 115 m. p. h. Ample reserve power. Cruises 4½ hrs. without refueling.

**Quick Take-off; Slow Landing:** Takes off in 11 seconds after 750 ft. run (only 1800 ft. run required from field 6200 ft. above sea level). Lands at 55 m. p. h.

**Power Plant:** Only transport on the market with 3 Pratt & Whitney 525 H. P. "Hornet" engines. N.A.C.A. cowling.

**Actual Pay Load:** 18 pass., 2 pilots, 1 steward and baggage (4057 lbs.); or 12 passengers and mail.

**Radio Equipped:** Bonded, shielded and wired throughout.

**Fabric Covering:** Permits speedy, economical, accurate inspection—a safety factor.

**Completely Equipped:** No extras to buy, no weight to add.

**Comfort Features:** Noise-proofed and insulated cabin, 6½ ft. high, 5½ ft. wide, 19 ft. long. Upholstered, reclining adjustable chairs. Heating and ventilating system. Hot and cold running water. Lavatory large enough to permit shaving. Individual reading lamps. Racks for hats and parcels. A custom-built job with many new refinements and conveniences.

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AUSTIN HAS . . . The Experience . . .  
The Information . . . . .  
The Nation-Wide Organization

**T**he greatest safeguard to wise and profitable investment in an airport or in any aviation building is the counsel of thoroughly experienced airport engineers.

Austin is airport information headquarters. In 49 cities from Coast to Coast, Austin has made site selection and surveys, and designed complete airports, both municipal and commercial . . . has designed and built hangars, depots and other buildings for many of the leading operators . . . has handled complete manufacturing plant projects for a number of the largest aircraft and parts manufacturers.

With 16 permanent district offices Austin is near at hand with organization and facilities to serve you well, no matter where your contemplated airport or building project may be located.

Good engineering is worth many times its cost. Austin Airport Engineers can give you valuable information, quickly, that will help you in planning your project right.

Just phone the nearest office, wire or write.



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AIRPORT ENGINEERS AND BUILDERS ♦ CLEVELAND



New York Chicago Philadelphia Detroit Cincinnati Pittsburgh St. Louis Seattle  
Portland Phoenix The Austin Company of California: Los Angeles, Oakland and San Francisco  
The Austin Company of Texas: Dallas The Austin Company of Canada, Limited

Memo to THE AUSTIN COMPANY, Cleveland—We are interested in ☐ Airport (Municipal) (Private) containing ..... acres.  
☐ Hangar ..... x ..... with ..... ft. clearance. ☐ Factory approx. .... sq. ft. Name .....  
Position ..... Firm ..... City ..... AD 12-29



# 3 OIL COMPANIES

Standard Oil Company of California

Standard Oil Company (Indiana)

Standard Oil Company of New Jersey

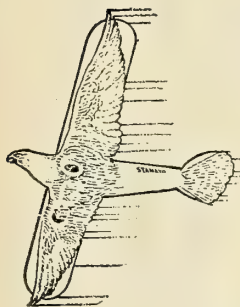
EACH CONTRIBUTED ITS  
EXPERT KNOWLEDGE TO

# STANAVO



# Then...

proved its incontestable stamina in countless flights as the utmost in AVIATION ENGINE LUBRICANTS



Designed by the leading experts and engineers of these oil companies; made from the finest raw materials that nature affords, refined and tested for weeks and months in the laboratory, on the ground and in the air — Stanavo Aviation Engine Oil is the day's outstanding contribution to flying.

To make possible the development of Stanavo, these three Companies placed their resources and facilities at the disposal of the Stanavo Specification Board, Inc., an organization of scientists selected because of their experience and skill in aviation and oils. After months of effort, during which hundreds of tests were made, these experts produced the oil that aviators today acclaim as "unsurpassed in quality and uniformity."

The Stanavo Specification Board, Inc., will continue its rigid specifications and exacting tests for all aviation products bearing the Stanavo trade mark. Stanavo (in grades suitable for all operating conditions) is available at the landing fields and airports of the nation. Full information may be obtained by addressing the Stanavo Specification Board, Inc.

## STANAVO AVIATION ENGINE OIL

One Brand STANAVO. One Quality  
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STANAVO SPECIFICATION BOARD, Inc.

1911 Chanin Building—122 East 42nd Street, New York City







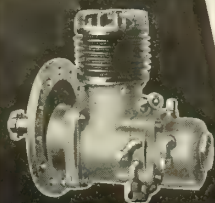
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The Heywood Starter is a marvel of simplicity — both  
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**STARTER  
by  
HEYWOOD**

# A SAFE PLANE *for 10-hour student flyers* ... and thrilling for those who've flown a thousand

HERE'S the SAFE light plane with Handley-Page wing slots . . . Here's the SAFE light plane with the low landing speed of 35 m. p. h. . . . Here's the SAFE light plane with an unfailing Cirrus 95 H. P. motor . . . Here's the SAFE light plane with the wide, split-axle undercarriage . . . Here's the SAFE light plane built to withstand 8 times the strain imposed in normal flight.

Pilots in 16 different countries fly the Avian for instruction, travel and sport. They herald it as the safest light plane in the world!

And no wonder!—for the Avian's design and equipment eliminate the every-day hazards of flying.

First, the Avian zooms up fast . . . up—up—up . . . from the smallest of fields . . . right up

## TO DEALERS AND DISTRIBUTORS

When you fly or sell the Whittelsey Avian you have something to talk about. No other light plane has such a record of performance . . . or the equipment. Dealers and distributors are still being appointed. Write for further information concerning our sales plan. We will gladly send you the detailed story of the plane itself. The Whittelsey Mfg. Co., 220 Howard Avenue, Bridgeport, Conn.

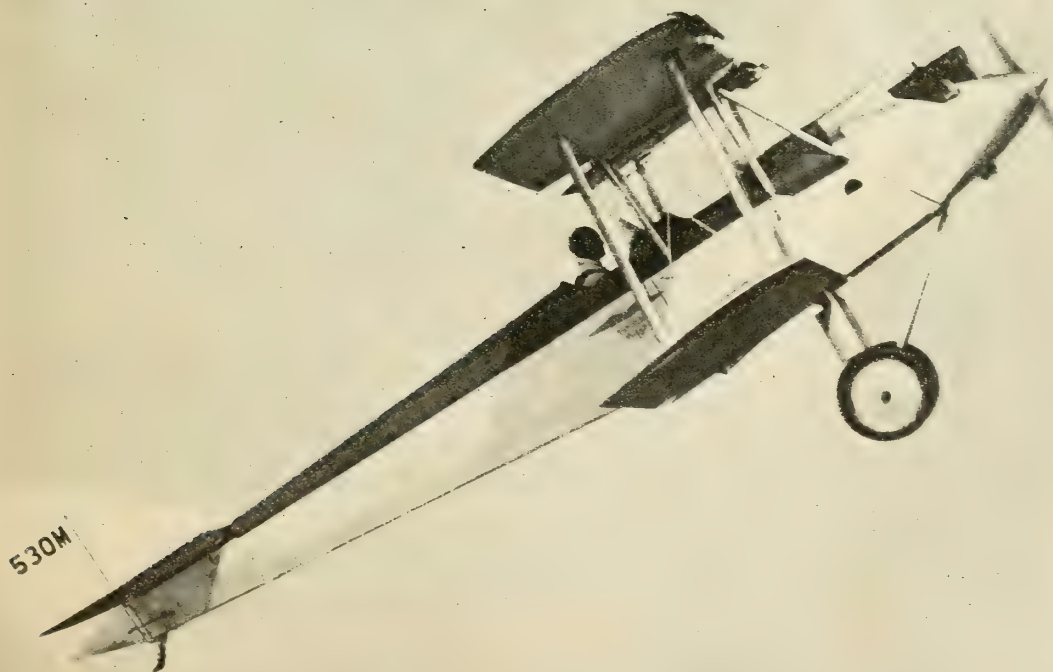
over barns and trees and wires—into the blue.

It speeds unerringly for distant ports, with that tireless, air-cooled Cirrus motor humming out the miles by minutes.

It performs the dizziest of stunts with perfect control. If it is stalled, those Handley-Page wing slots stabilize the plane and guard against the spin.

It makes any fair-sized clearing its port. For it floats into an easy 3-point set-down at the unusually low landing speed of 35 m. p. h. Its wide and shock-absorbing undercarriage has no fear of even the roughest ground.

Its price is only \$4995 flyaway or f. o. b. Bridgeport. It makes every gallon of gas do 20 miles of work. Time payments arranged. Write for full data and specifications.



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THE OUTSTANDING SPORT AND TRAINING PLANE OF THE WORLD

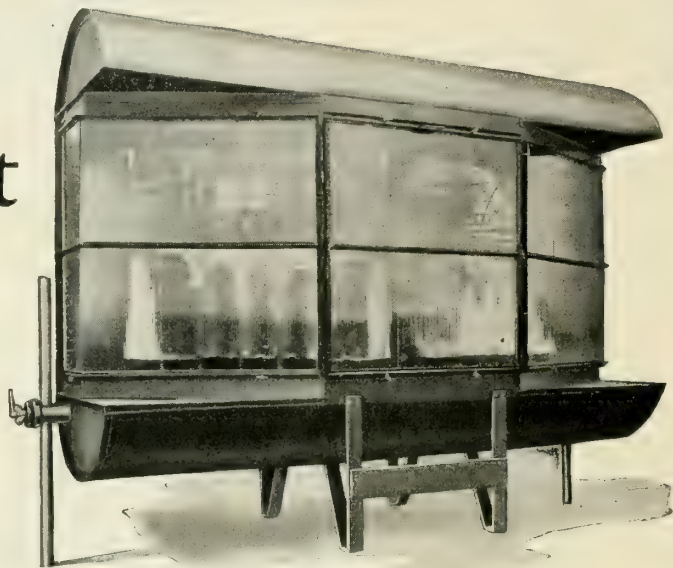


LIGHT WILL PUT YOUR AIRPORT ON THE NIGHT MAP OF AMERICA



# The New G-E Airport Floodlight

MOST POWERFUL  
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NO OTHER single unit produces so much light with so little glare. Eight 3000-watt lamps are used. The light from them is distributed evenly through 180 degrees and glare is minimized by confining the beam to a low height above ground.

No other unit is so efficient. The adjustable reflectors make certain the proper light distribution on any field. The unit is totally enclosed and self-cooled. It has no ventilator or fan.

No other unit is so reliable. Should several of the lamps burn out, the light on the field is sufficient to afford visibility for night landings. This unit is suited for remote control and does not require an attendant.

Port Columbus, the first stop on the T. A. T. route, has adopted this unit for field floodlighting. Complete information is available at the nearest G-E sales office.



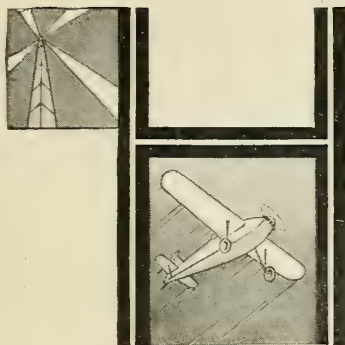
For ten years, General Electric has manufactured equipment specially designed for airport and airway lighting. In fact, a majority of the equipment in use to-day bears the G-E monogram. Look for this emblem also on MAZDA lamps, transformers, control equipment and cable.

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## HOW ABOUT MY FUTURE IN AVIATION?



It doesn't take long to become an expert airplane and engine mechanic at Parks. It doesn't cost much, either. The course is intensive, interesting and, above all—*thorough*. You are given *individual instruction* by men recognized and licensed by

ON every hand you see men, with no more ability than you have, making good as airplane and engine mechanics. Good jobs—good pay—the most pleasant work they have ever known!

Probably you have asked yourself, "How about *my* future? What does the aviation industry hold for *me*?"

The answer is simple. There are *plenty of jobs for trained men*—men with the kind of training *you* can get at Parks Airplane and Engine Mechanics School.

Parks graduates today are holding down jobs they never could have filled without the training they got here. Why are they in such demand? Because the heads of aviation companies know that every Parks student is given the *best instruction* by the *best teachers*, using only the *best methods and equipment*.

the United States Government, whose only aim is to fit you for a place in the tremendously profitable and fascinating aviation business.

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"Galloping ailerons, Looper, that student of yours won't have any airplane after a few of those landings."

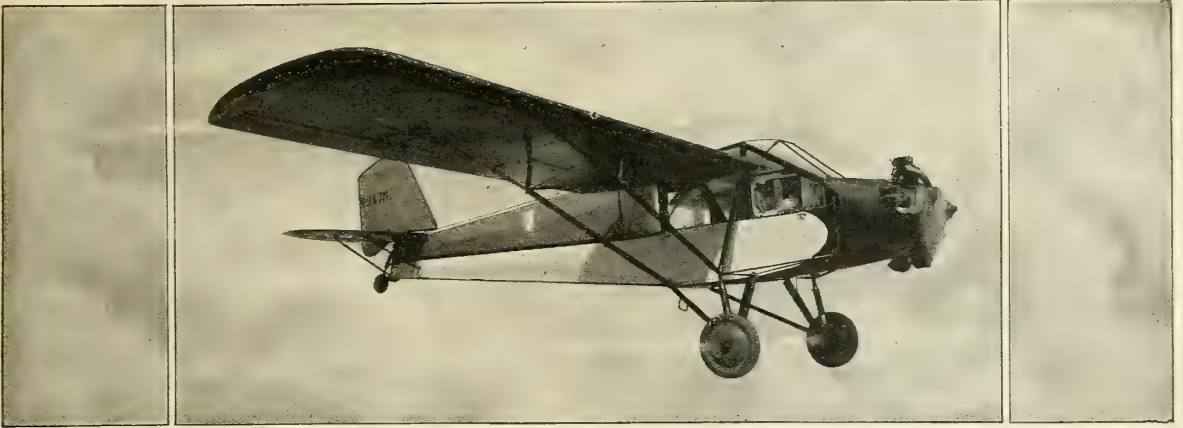
"I'm not worrying. That's an Eaglerock with Kinner motor. It's built to stand that sort of thing."

We don't recommend that any airplane be abused, but we know that the Eaglerock with Kinner motor is ideal for student training. It's built to stand hard usage. Price at factory is \$3907 or you can buy it on time.

*For more details write or wire.*



403 Alexander Industries Bldg.  
Colorado Springs, Colo.



# THE NEW B/J--The First Full Vision Plane

**N**OW—an enclosed plane without a blind spot. The B/J engineering staff, drawn together for the pioneering of new designs for military planes, has carried this same original designing into a two-place tandem monoplane for commercial, private or training use.

The result is that the first commercial B/J embodies a new wing arrangement that affords full vision in all directions.

Seated at the controls of the new B/J, the pilot commands a full, clear view . . . overhead . . . above and below the wing on either side . . . and to the rear. By a movement of the eye or turn of the head he views the entire cyclorama of land and sky.

The ample side windows, of shatter-proof glass, may be opened or closed at will.

Combined with this unique full vision design are remarkable stability, easy yet positive controls, and numerous other features which make the B/J especially suited for student training or private flying.

The advanced design of control surfaces and gear afford a degree of maneuverability and control comparable to that of military aircraft. High

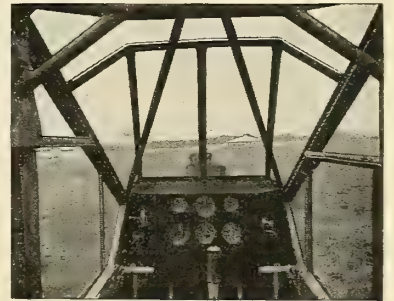
cruising speed, ample fuel capacity and relatively small fuel consumption result in a wide cruising range. A high angle of climb, slow landing speed and wheel brakes make the plane well adapted for small field operations and for private use.

Setting new standards in ease of handling and in safe, comfortable, care-free flying, the B/J is a "Pace-maker of the Air" in salability as well as in performance. Write for further information about this new B/J, and about distributor territories still open.



A view inside the comfortable, roomy cabin of the new B/J, showing the all-window construction which begins at a level with the pilot's waist and extends above the wing, back beyond the rear seat and across the top.

The pilot of the new B/J has only to move his eyes or turn his head to command a full, clear view in all directions—overhead, above or below the wing on either side, or to the rear.

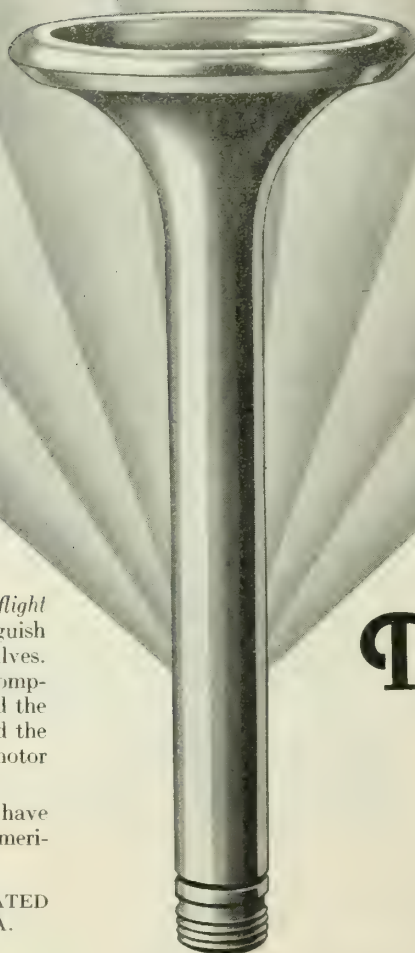


Taking off or landing, a broad, clear view of both land and sky spreads before the pilot of the new B/J. Equipment includes clock, compass, tachometer, air speed indicator, altimeter, oil pressure, temperature and gasoline gauges.

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BALTIMORE MARYLAND  
"PACEMAKERS OF THE AIR"



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*Sustained power in the air and more flight hours before overhauls distinguish motors equipped with Thompson Valves. Thompson metallurgy insures in Thompson Valves the stamina to withstand the constant pound of valve on seat, and the white-hot temperature of airplane motor operation.*

That is why Thompson Valves have been chosen for every important American endurance flight since 1924.

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ORIGINAL EQUIPMENT IN 95% OF AMERICAN-BUILT AERO MOTORS



# PILOTS SAT ON THE LEADING EDGE



WHEN U. S.

# BUILT THE FIRST PNEUMATIC AIRPLANE TIRES



Back in the early days when flying was young — when courageous pioneers piloted their flimsy planes from unprotected seats perched on the leading edge of the lower wing — when flying and flyers were regarded seriously by few — that's when the United States Rubber Company first built pneumatic airplane tires and offered them to the infant industry.

Planes were lighter then and speeds far lower than today's. But then, as now, ground safety depended on the durability and strength of tires. And as requirements grew more exacting — as planes grew heavier and greater speeds were

attained — the U. S. Rubber Company continued to pioneer in the development of airplane tires.

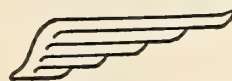
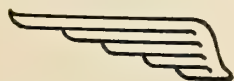
More than 20 years of research and development are behind the modern U. S. airplane tire. There is a complete range of sizes with either plain or non-skid treads. And every tire in the line is of web-cord construction — an exclusive U. S. development which guarantees maximum strength without excessive weight. U. S. Branches are prepared to give immediate service to manufacturers and users everywhere.

UNITED STATES RUBBER COMPANY

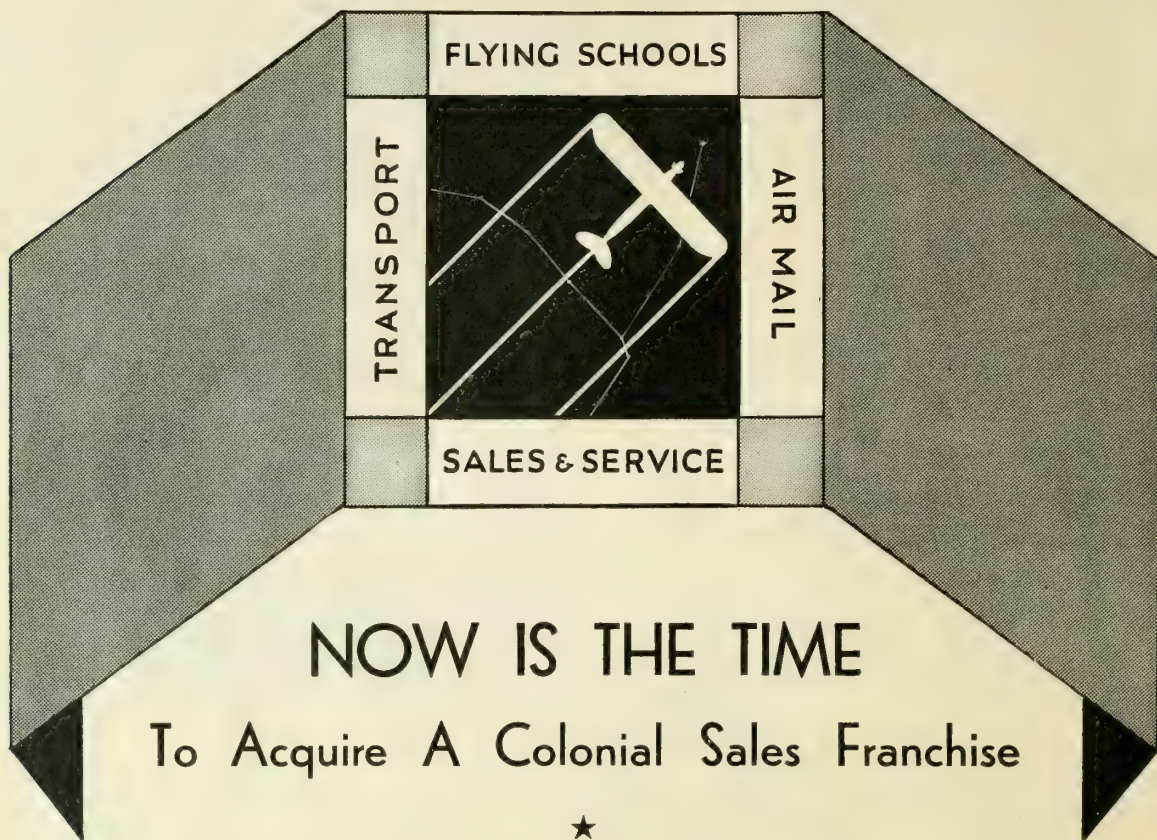
Travelair six-place monoplane  
equipped with United States Tires



UNITED STATES  
A I R P L A N E  
T I R E S







## NOW IS THE TIME To Acquire A Colonial Sales Franchise



Rapidly throughout New York State and New England, Colonial dealer franchises are being secured by business men who see the profit possibilities in the sale of planes.

The market for the sale of planes is definitely known and is expanding. It includes: (a) training schools and student fliers; (b) business organizations; (c) private owners, and (d) operators for charter service and passenger hopping.

The line of planes distributed by Colonial Flying Service is too well known to require much comment. It includes those makes best suited to the demands of the volume market. FLEET, CHALLENGER, FAIRCHILD, PITCAIRN and STANDARD aeroplanes are distributed by Colonial Flying Service through New York State and New England.

A Colonial dealer has available to him a fund of practical information which is the result of Colonial experience in the successful operation of Air Mail and Air Transport lines.

Any service demands made by a dealer of his customers are easily met through the chain of Colonial Service stations located at strategic points in New York State and New England.

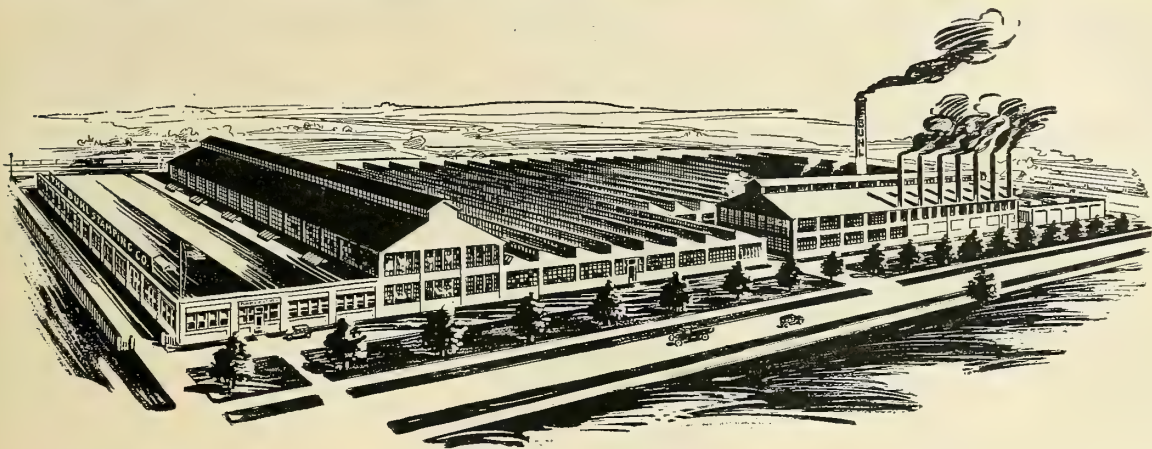
District sales offices are located at Boston, Buffalo, Hartford and Schenectady. Service facilities are also available at Newark, Albany, Utica, Rochester, Cleveland and Toronto and Montreal, Canada.

For complete information as to territories available and conditions for securing a sales agency, write to Colonial Flying Service, Inc., 270 Madison Avenue, New York City.

# COLONIAL FLYING • SERVICE

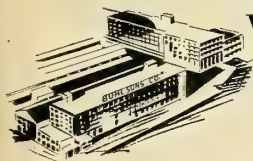


DIVISION • OF • THE • AVIATION • CORPORATION



**T**HE chief qualification of leadership lies in the ability to pick lieutenants. In the aircraft industry today the fundamental importance of this fact is particularly apparent. Those who will lead tomorrow are those who build soundly today. The Buhl Stamping Company supplies many outstanding manufacturers with metal stampings of all kinds and descriptions.

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# EMSCO

A COMPLETE LINE OF AIRCRAFT FOR LAND AND SEA



**THE EMSCO CIRRUS**—A two-place, sport and training, mid-wing monoplane, powered with a 95 h.p., four-cylinder, air-cooled American Cirrus motor.



**THE EMSCO B-3**—A single motored, eight-place, cabin monoplane transport that may be powered with a Wright 300, a Pratt & Whitney Wasp or Hornet engine.



**THE EMSCO CHALLENGER**—A tri-motored, eight-place, cabin monoplane, built to the same specifications as the B-3, except that it is powered with three Curtiss Challenger engines of 170 h.p. each.

## EACH A LEADER IN ITS CLASS!

Engineered on sound principles that have been proven by years of experience in commercial and military aeronautics... Built by master craftsmen in a new \$1,000,000 factory equipped with the most modern approved production methods.... These three types of Emsco Aircraft are proving every day their superiority in providing safe air transportation with greatest economy.

The Emsco Cirrus has flown cross-country under normal flying conditions with a fuel consumption of only 4.8 gallons per hour at cruising speed. Twice the B-3, powered with a 300 h. p. Wright Whirlwind has taken off a gross load of approximately 10,000 pounds with a run of a half mile. The Emsco Challenger has demonstrated its dependability, safety and economy by flying

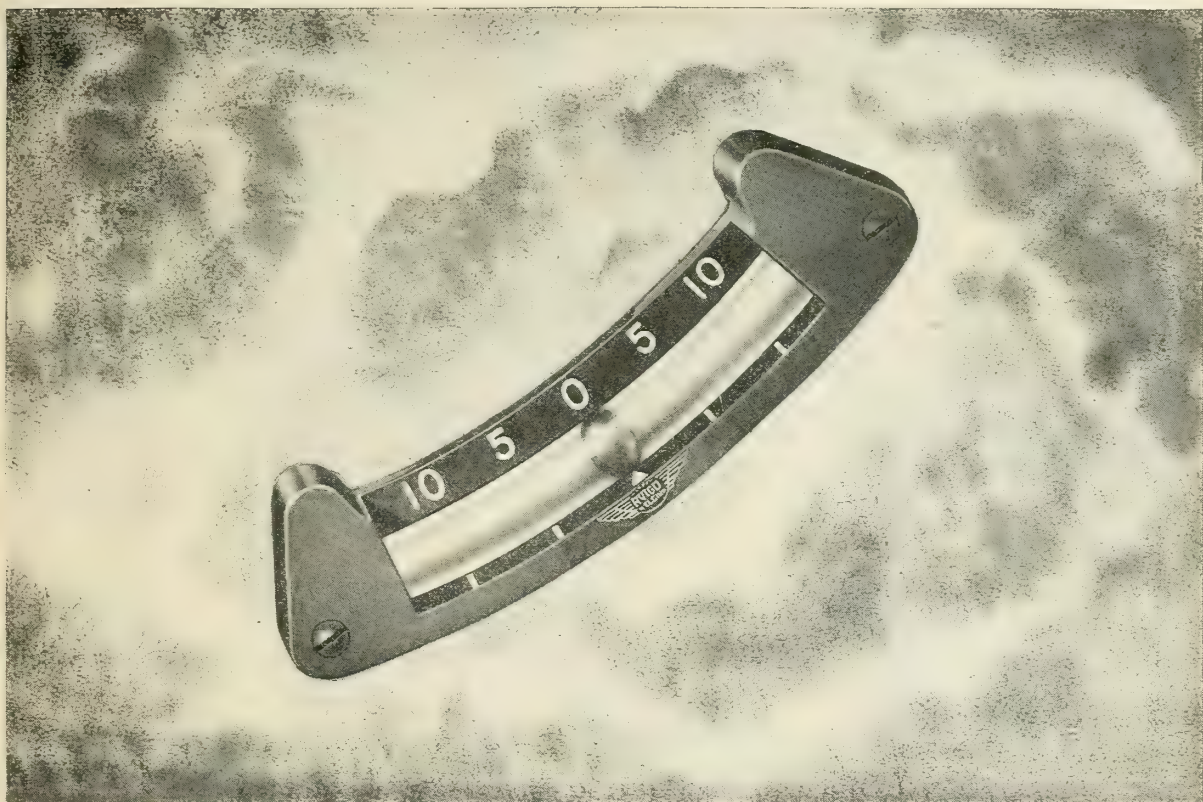
more than 25,000 miles, under all conditions, within the last four months.

The Emsco Aircraft Corporation is the most recent addition to the world-wide chain of Emsco enterprises, which now number nearly a score. Most prominent among them is the Emsco Derrick & Equipment Co., with plants in Los Angeles, Calif., and Dallas and Houston, Tex. The same sound business principles that have made the name EMSCO on drilling and production equipment, in the oil fields of the world, a guarantee of quality and integrity, are the foundation of this new industry which is but a logical and forward step in the rounding out of Emsco Industrial and commercial activity.

All Emsco land planes are delivered from the factory with pontoon fittings so that no structural changes are necessary to quickly adapt them to seaplane work. The B-3 may easily be transformed into a tri-motored plane as fittings for outboard motors are standard. Structurally the planes are identical.

Complete specifications, performance data and prices will be forwarded on request.

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## IN THE FOG

One of the most comforting instruments to have on your board when you get caught in the fog is an Elgin Avigo Ball Bank Indicator. It has this advantage over the old "bubble" type of indicator . . . it

doesn't indicate in reverse but follows the motion of the ship. Absolute accurate check upon your "feel" of the ship. Made by ELGIN . . . makers of precision instruments for 60 years.



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Military type of ship using Micarta  
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Pulleys — Self-lubricating  
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## Strength and Toughness in Micarta Aviation Products

Military and commercial planes must be built to withstand the effect of varying atmospheric conditions—moisture, heat, cold, as well as friction and corrosion. You are almost sure to find Micarta pulleys, fairleads and hinge-bearings on ships of this type.

The Thomas-Morse Aircraft Corporation, Fokker, Curtiss and many other well-known manufacturers have adopted Micarta for these applications because of its tough, wear-resisting, non-corrodible character. Micarta is also used for propellers and, in a different form for cabin lining. Write for complete information.

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# Westinghouse

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## Reducing Friction in the American Cirrus Mark III

In designing the American Cirrus Mark III, Cirrus Engineers realized that Federal-Mogul Bearings ideally met their exacting specifications—specifications that assure close-limit bearings of extreme reliability and frictionless operation.

Federal-Mogul is proud to add American Cirrus to the ever growing list of aircraft engine builders using Federal-Mogul Bearings. Others included in this list are Wright, Curtiss, Pratt and Whitney, Le Blond, Szekeley, Anzani, Continental, and many others.

Like leading automotive manufac-

turers, these aircraft engine manufacturers deal with known factors. They know that Federal-Mogul products are unsurpassed in accurate, close-limit manufacture; that they are developed and produced by an engineering and metallurgical staff of unparalleled experience and ability.

The aviation industry has come to the same conclusion arrived at by the automotive industry many years ago—that they can rely upon Federal-Mogul as an absolutely dependable source of supply, backed by thirty years of experience, specializing in this type of manufacture.

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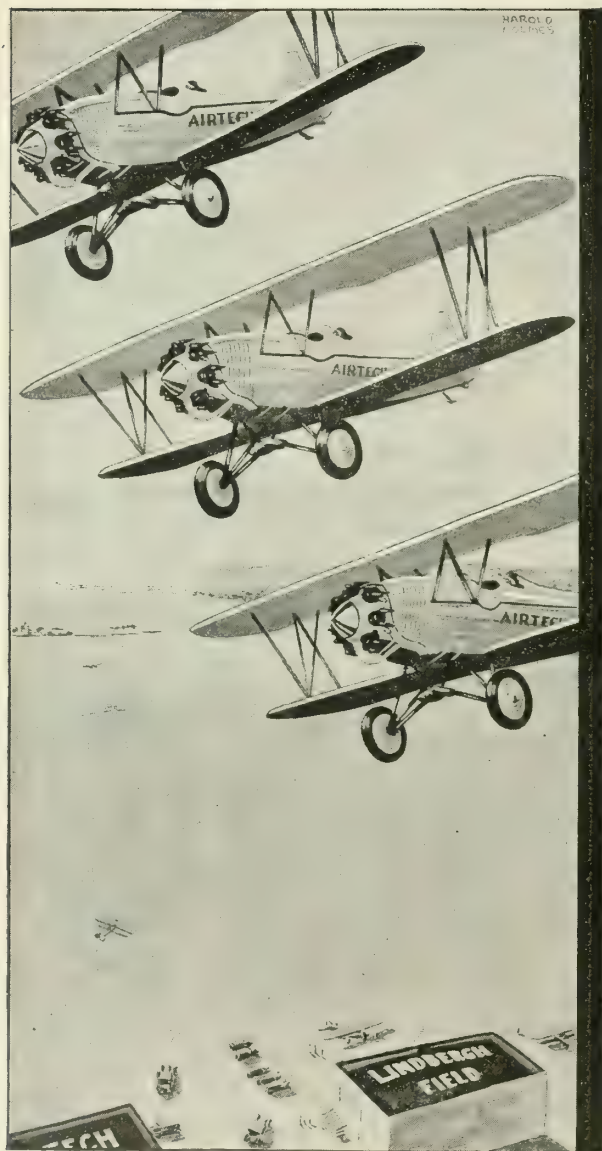
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Die-Cast Babbitt Bearings and Bushings  
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## Where Sunshine Spends the Winter

Learn to fly without the hazard of icy blasts and biting cold; of snow and sleet. Train at AIRTECH where sunshine spends the winter.

In addition to the main school at San Diego, AIRTECH conducts a winter branch, from November 15 to March 15, at Palm Springs, California. At this foremost winter resort, AIRTECH students learn to fly in America's most perfect winter climate.

At Palm Springs and San Diego, AIRTECH operates Schools of Aviation under Department of Commerce approval. Students now enrolling for this recognized training will be equipped to take their place in aviation when spring brings renewed activity on Eastern Airports.

Write now for «Flight Facts from Lindbergh Field»—and learn aviation where sunshine spends the winter.

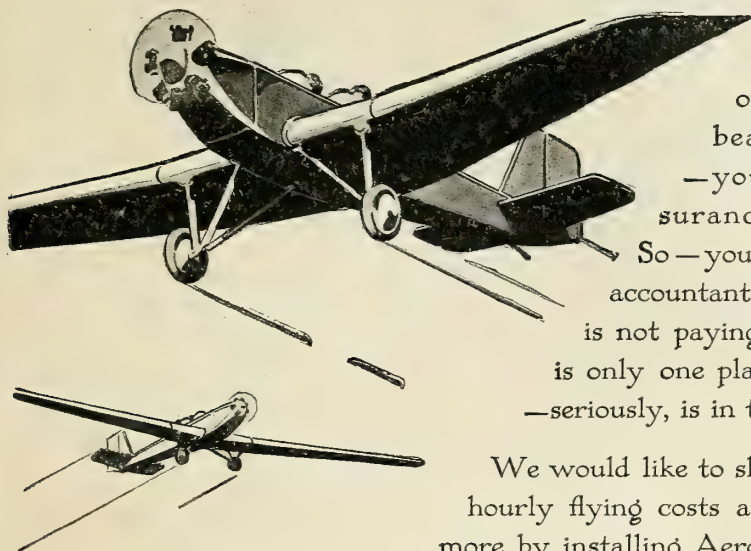
# Airtech School of Aviation

Department of Commerce Approved  
Transport Ground and Flying School

Lindbergh Field

San Diego, California

# ARE YOU UP IN THE AIR ABOUT COSTS?



YOUR instruction charges are based on so many hours of student flight. Each hour must bear its ratio of fixed charges—your rent, taxes, payroll, insurance, and many other items. So—you don't need a certified public accountant to tell you that if your school is not paying the profit it should—there is only one place for the leak—and that—seriously, is in the air.

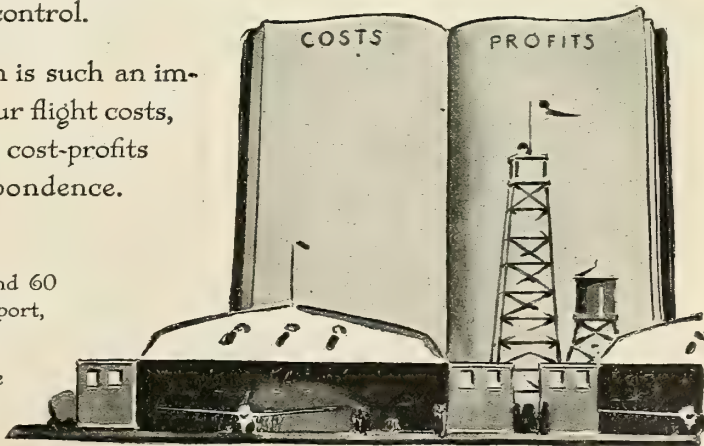
We would like to show you how average hourly flying costs are reduced 30% or more by installing Aeromarine planes as standard equipment. Their economy extends to operation, minimum of maintenance, ground handling and hangar space.

The AKL-25 is the ideal light plane for training and for sport. Powered by the famous, dependable Salmson 40 horsepower, nine-cylinder radial,—or by the equally well known, sturdy LeBlond 60 horsepower, five-cylinder, radial engine (\*) . . . these planes are built to stand rough handling and to win friends for your school by their ease of control.

Since economy of operation is such an important factor in reducing your flight costs, we would like to take up your cost-profits problem with you by correspondence. Write us today.

(\*) The AKL-60, powered by the LeBlond 60 h. p. engine, sells for \$3500, flyaway, Keyport, N.J.

Equipped with pontoons and powered by the LeBlond engine, the AKL-60 sells for \$4500, flyaway, Keyport, N.J.



**AEROMARINE KLEMM CORPORATION**  
PARAMOUNT BLDG. • 44th STREET AND BROADWAY • NEW YORK CITY





**SPECIFIED by  
The Leading Pilots**

On looking over the blue prints of a new engine design or when inspecting the finished product, one of the first questions a pilot asks is "Are the bearings Bohn Ring True?"

He knows the large measure of protection he can depend on if Bohn Ring True Bearings are specified.

He knows this bearing and only this bearing is built according to high quality standards which insure safety. That's why 95% of the bearings used for aircraft engines are the Bohn Ring True product.

Having made a specialty of aircraft bearings since the inception of the industry, this organization has a wider knowledge and a fuller bearing experience to offer aeronautical engineers.

*Aircraft Division*

**BOHN ALUMINUM & BRASS CORPORATION  
DETROIT, MICH.**

New York Chicago Philadelphia Cleveland Pittsburgh





## Decreasing Weight Increasing Safety

In every designing room in the aircraft industry, engineers are wrestling with the double problem of weight reductions and increased factors of safety.

Many of these engineers have found a solution in Bohnalite—that new light alloy which is 62% lighter than iron.

So here's our suggestion: Send us your castings and blue prints. Our aircraft experts will study your present practice and will submit an opinion on the possible utilization of Bohnalite which might prove of value.

Having helped to solve many an aeronautical problem in both designing and casting requirements, undoubtedly the aircraft division of this organization can assist you.

A thorough knowledge of alloys, heat treatments and castings as applied to aeronautics are factors on which the Bohn organization has specialized.

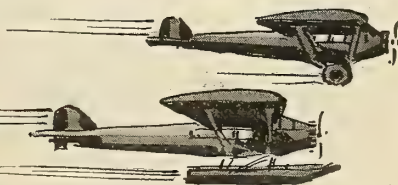
We suggest that you follow our suggestion. Send us your samples and blue prints—or if you prefer our engineers can arrange to study the problem in your own designing room.

*Aircraft Division*

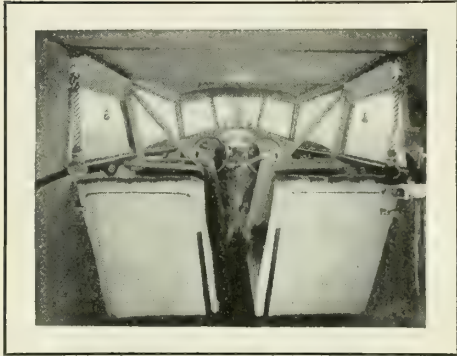
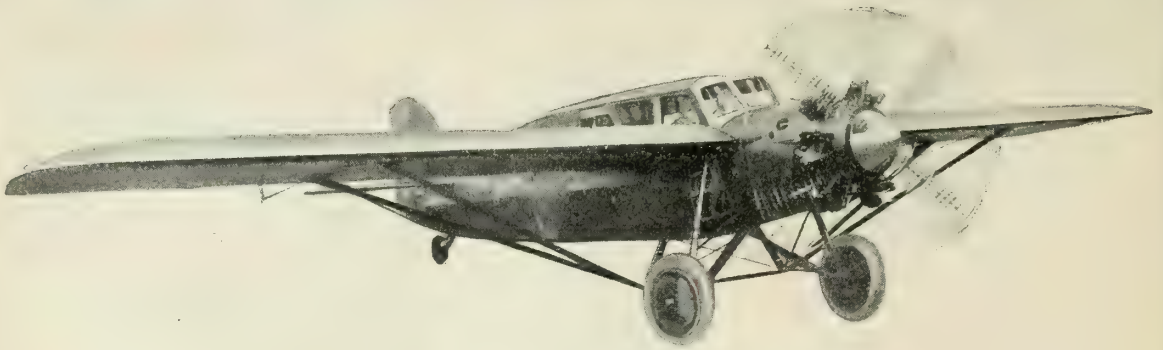
BOHN ALUMINUM & BRASS CORPORATION, DETROIT, MICHIGAN  
New York Chicago Philadelphia Cleveland Pittsburgh

# BOHNALITE

62% LIGHTER THAN IRON







## Why Pilots are Eager to Fly the Center-Wing!

Its keen performance attracts everywhere—and why not? Looks different,—*is different*. And that difference is the answer to its remarkable maneuverability.

Wings placed in perfect alignment with the center of the propeller thrust gives balance and stability beyond belief. For passenger and business flying, the Invincible has every convenience plus luxurious appointments. Priced at \$7800 fly-away Manitowoc.

Aircraft Division of the INVINCIBLE METAL FURNITURE CO., Manitowoc, Wis.

# INVINCIBLE Center-Wing MONOPLANES



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## *The* COMMODORE "The pride of the sky"

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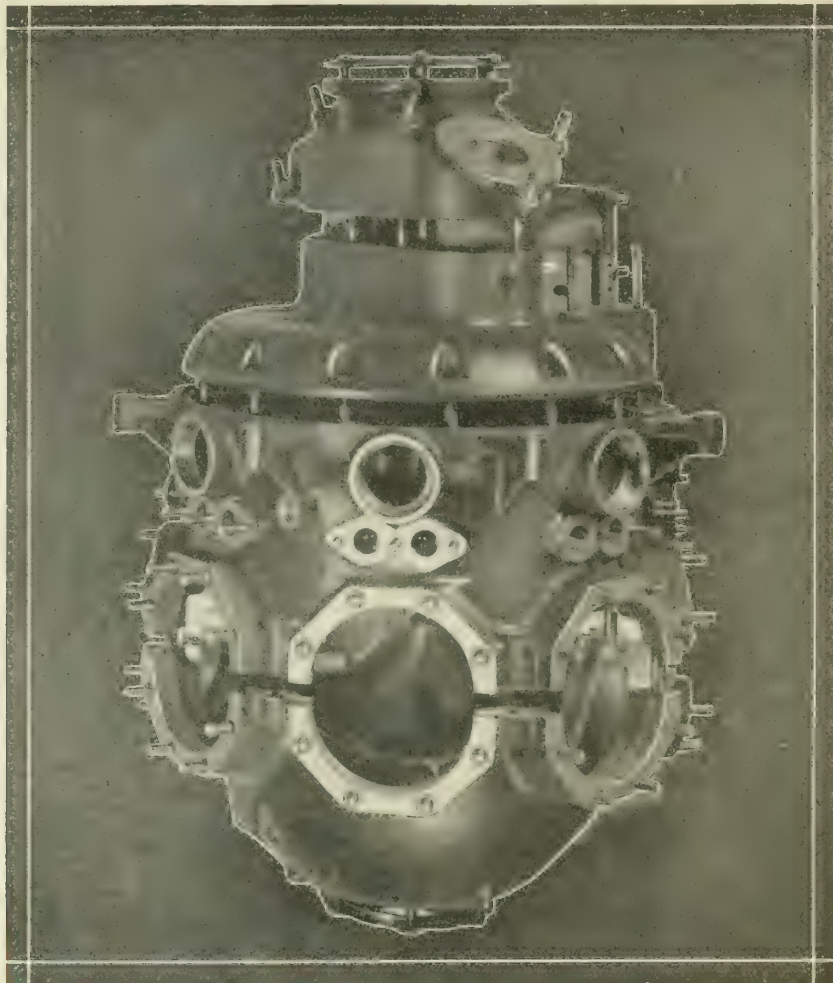
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Boeing Air Transport has fixed October as the date for the inauguration of the flights of the first 18-passenger trimotor service between San Francisco and Chicago.

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So that you may have the facts about this service I am enclosing a statement giving details of the plane construction, and the new service. I am also sending you a picture properly captioned. Should you desire additional pictures we will be glad to hear from you.

Yours very truly,

*Harold Gray*

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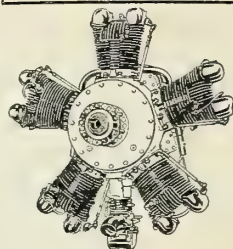
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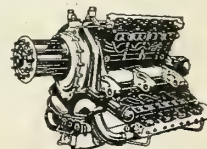
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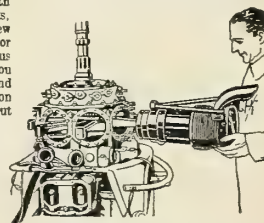
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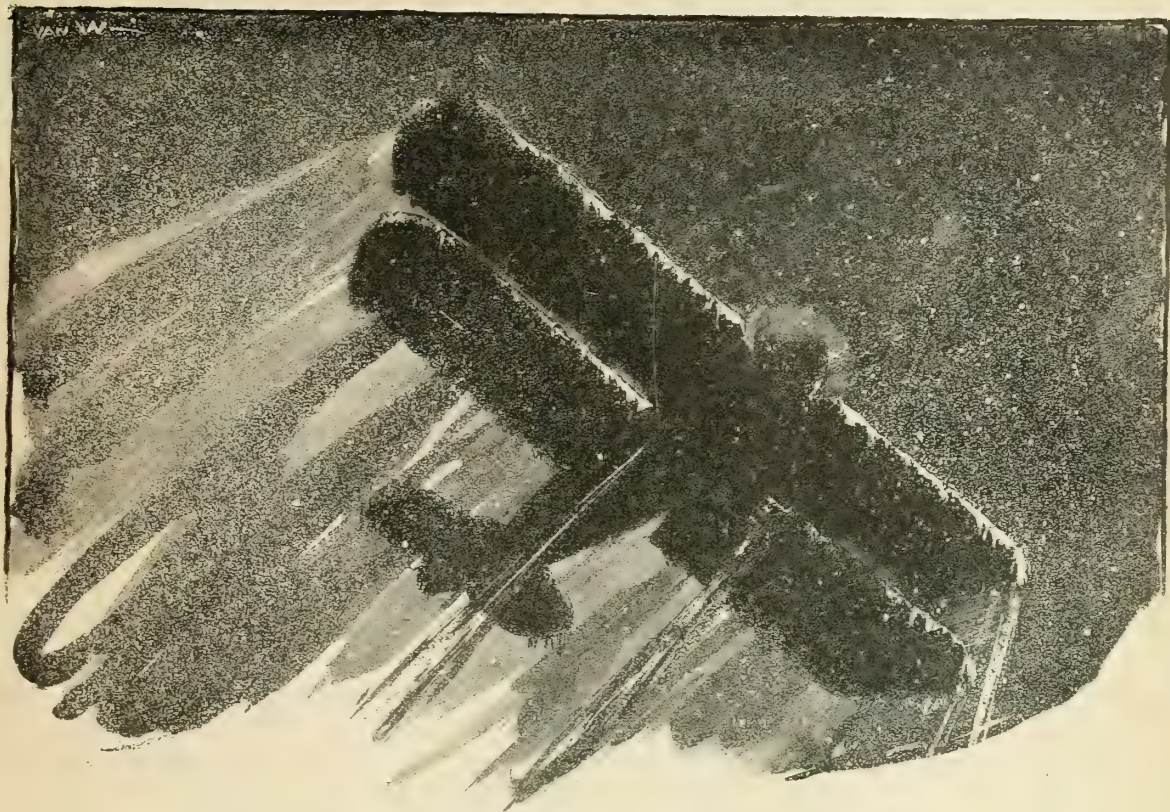
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"	"	"	"	9857	"	"	4,675.	Garden City
"	"	"	"	8797	"	New	4,750.	"
"	"	"	"	8787	"	"	4,650.	San Francisco
"	"	"	"	NC-9094	"	"	4,550.	Valley Stream
"	"	"	"	9095	"	"	4,280.	Boston
"	"	"	"	C-8141	"	"	4,675.	Indianapolis
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"	"	"	"	NC-3315	J5	"	4,000.	Boston
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Travel Air	Bi.	Open	5 & Pilot	NC-6015	OX5	100	1,700.	"
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"	"	"	"	NC-4851	OX5	"	1,750.	Moline
"	"	"	"	C-6295	OX5	113	1,600.	Bridgeport
"	"	"	"	NC-5392	OX5	"	1,600.	"
"	"	"	"	C-9029	OX5	363	1,350.	Miami
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Stinson	Bi.	Cabin	3 & Pilot	NC-2779	Less engine	"	1,500.	Boston
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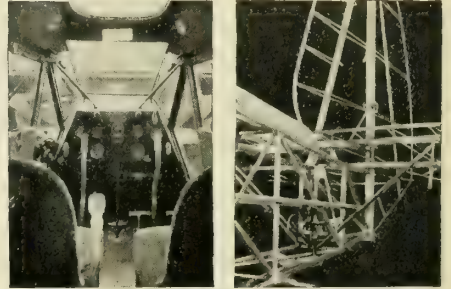
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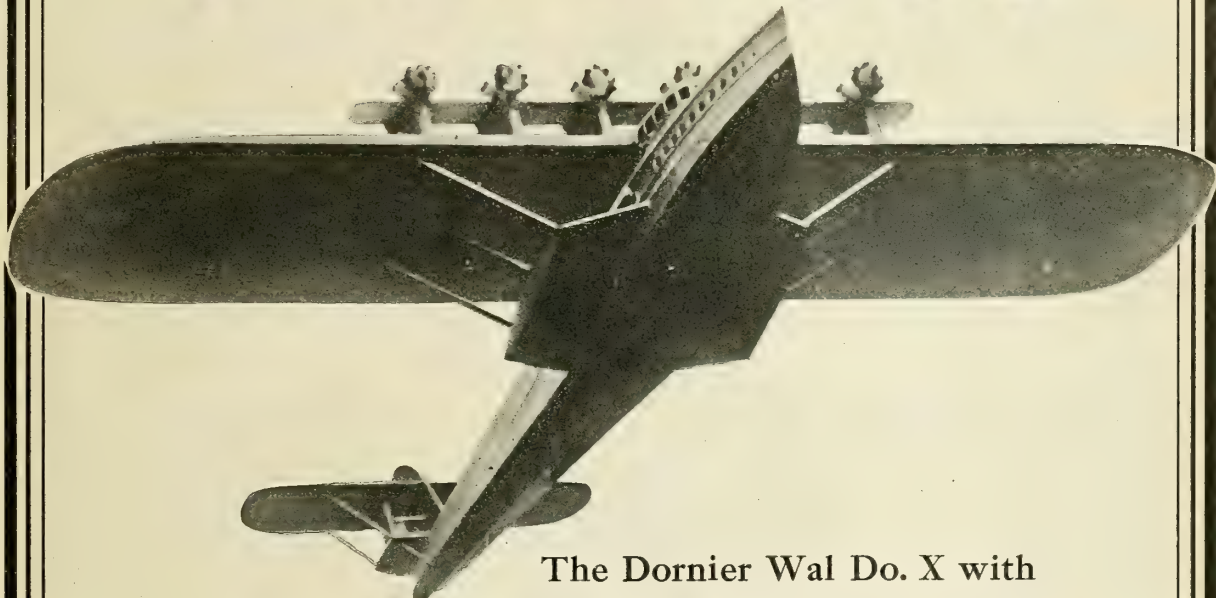
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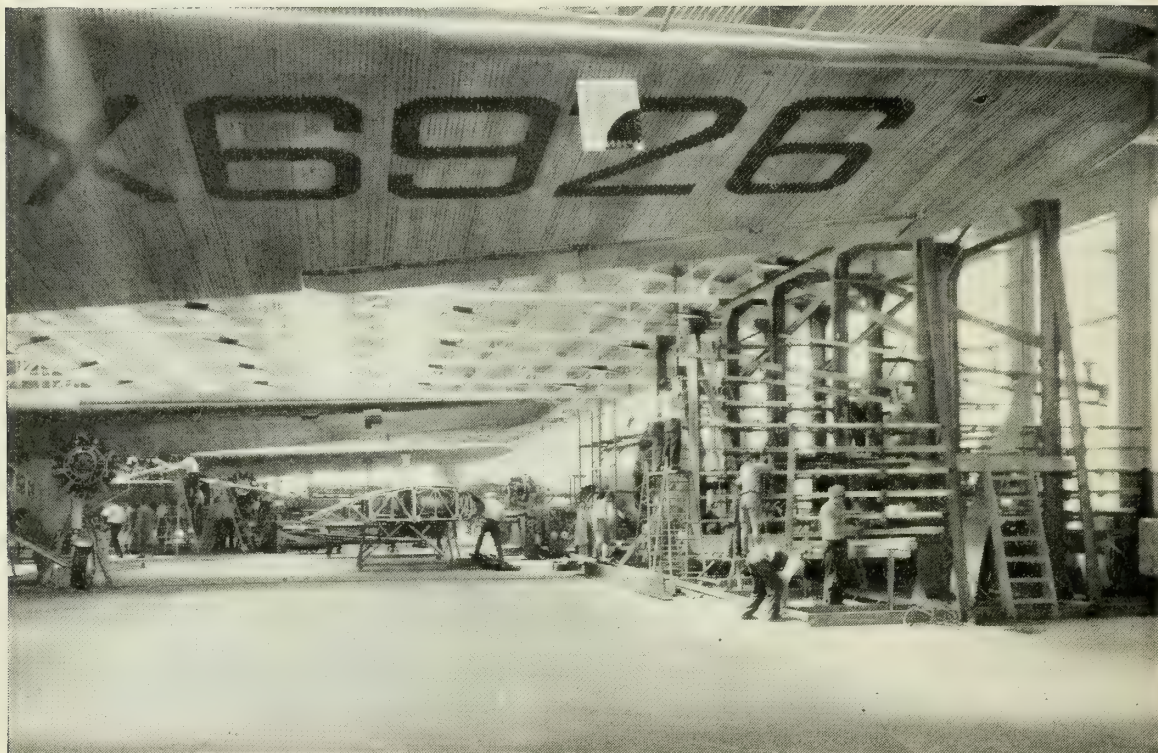
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Volume 15  
No. 6

# AERO DIGEST

DECEMBER  
1929

THE MAGAZINE OF THE AIR

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*Photo by Aero Corp. of Calif.*

*A group of Fleet training planes over the clouds in California*

# WEATHER AND AIR TRANSPORT

**M**ETEOROLOGY, as a practical science applied to aeronautics, has made remarkable advances during the twenty-six years of mechanical flight. Led by the United States Army Air Corps, considerable advance has already been made in the matter of projecting airways in relation to climatic conditions. The Civil Bureau of Aeronautics repeatedly emphasizes the value of practical meteorology. There is also useful application of climatology in laying out municipal airports according to local weather conditions.

Today, the improvement in radio transmission and reception makes possible the valuable adjunct of supplying pilots while in flight with current weather data. The structure of thunderstorms, as well as other weather conditions important to flying, has been studied by meteorologists as aerial observers and air pilots. The knowledge of meteorology is daily becoming more adequate, and its application is becoming more widespread.

First in importance in the study of meteorology is the penetration of the upper air by means of sounding-balloons. Second only to this is the first-hand observations of weather by pilots traversing the atmosphere in balloons, airships and airplanes.

One of the most valuable contributions to the knowledge of the earth's atmosphere was the investigation of the stratosphere and troposphere by the United States Weather Bureau in the summer of 1913. This was accomplished over Catalina Island, which is about twenty-five miles south of Los Angeles harbor. Twenty-three meteorographs (temperature, pressure, and humidity-recording apparatus) attached to free balloons were dispatched and eighteen were recovered.

The most valuable lesson learned for aviators and aeronauts by these ascents was that the winds were uniformly from the west and southwest and that their velocities increased only in direct proportion to the decreased atmospheric pressure. These and other observations of the upper air lend no support to the old-time theory of extraordinary high wind movement many miles above the earth's surface. Although these soundings were made within the earth's envelope and took place sixteen years ago, subsequent ascents into the stratosphere of latitudes both north and south in various parts of the world have served to verify the Catalina findings.

Europe has fewer varieties of non-flying weather and, it is said, somewhat more favorable meteorological conditions for flight than the United States, which undoubtedly accounts for much of European progress in commercial aviation. A chart of the storm tracks of the world indicates that most of the atmospheric disturbances pass through the United States and some of the fiercest storms originate along its southeast and southwest coasts.

As will be seen by the foregoing storm map of the United States (Figure 1), there are seven well-marked storm tracks across the United States. All of these paths enter or originate in the West, Southwest or South, and their invariable exit is beyond the confines of the United States. Over these storm tracks travel all migrating storms. It is owing to the west-to-east movement of the earth's air that transcontinental flights from west to east can be made in faster time than from east to west (see Figure 2).

By Dr. Ford A. Carpenter

*Manager, Dept. of Meteorology and Aeronautics,  
Los Angeles Chamber of Commerce.*

In addition to the northeasterly trend of storms, there is the well-known circular nature of the winds which blow inward contrary to the hands

of a watch, in the instance of a cyclone or "low." The advancing front of a low area (especially in the southeasterly quadrant) is accompanied by moist and warm weather. The rear of a low is noticeable for dry and colder weather, especially in the southwest quadrant. These are the fundamentals of weather control with which every weather-wise air pilot is well acquainted.

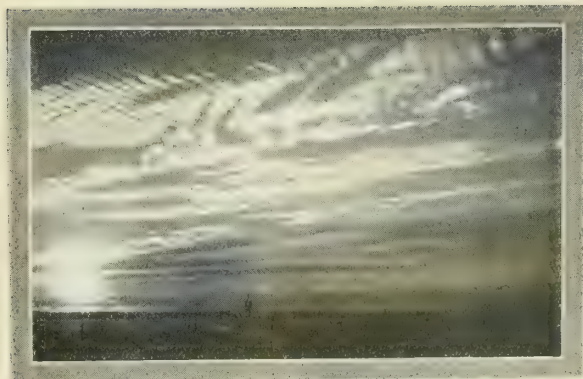
The variations in the behavior of areas of high and low barometric pressure—their journeys across the United States (often with the speed of a transcontinental train), their contraction or expansion, their tendencies to coalesce or to disappear—these are some of the things which a meteorologist must diagnose if he is to forecast the weather successfully. It is here that I wish to pay tribute to the little understood and often unappreciated Weather Bureau men. The Federal meteorological service, in its half-century of existence, has commanded the admiration of the world in its efficient and painstaking work. From its very inception, the weather service of the United States has been composed largely of conscientious observers and officials, remarks by laymen to the contrary notwithstanding.

The necessity of giving meteorological instruction to air pilots cannot be overemphasized. No one phase of their navigation is more important than meteorology. A pilot may closely diagnose weather conditions from the clouds by remembering the arrangement of cloud forms with an anticyclonic, or a cyclonic area, and by bearing in mind the appearance of the last weather map showing the tendencies of these fair and stormy areas. Cirrus clouds—those feathery, fantastic curls of vapor flung far aloft—always precede low pressure areas. Following these clouds are the cirro-stratus and cirro-cumulus. The latter are threatening when the intervening patches of sky are a dirty gray; they promise clearing weather if the spaces are bright blue.

The meteorological observer should remember that cloud masses become thinner with altitude and that, although stormy weather generally manifests itself first from aloft, cloud thickness in an especially large low pressure area sometimes exceeds the ability of the aviator to overtop it. This is especially true in mountainous regions where moisture-laden air currents are forced upward and cooled by expansion, producing clouds of considerable height and extent.

During the year 1920, through the active coöperation of four scientific agencies, daily charts were prepared of the height and hourly extent of clouds. The institutions thus engaged were the U. S. Weather Bureau, the Carnegie Institution of Washington at the Mount Wilson observatory, the Army Air Service of Ross Field, and the Department of Meteorology and Aeronautics of the Los Angeles Chamber of Commerce. It was shown that, although the sunsets were nearly always clear, it would not be feasible to schedule a morning flight earlier than seven o'clock during the spring, summer and autumn. It was also found that the clouds during these three seasons of the year averaged a thousand feet in thickness. Above that altitude the sky was cloud free. During the winter months, the clouds were often more than a mile in thick-





Cirrus and cumulus clouds preceding an area of low pressure

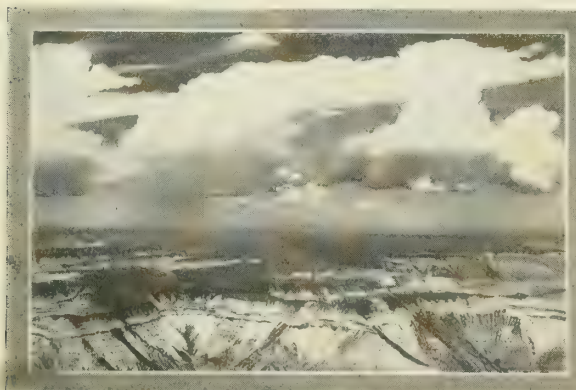
ness, with a low ceiling.

Along one of the airways of California the matter of fog distribution was given well-deserved study through the cooperation of the Guggenheim Fund for the Promotion of Aeronautics and the United States Weather Bureau. Spring and summer fogs along the Pacific Coast offered a problem with few variables, and considerable progress has been made in reporting the extent and duration of fog in that region.

If fog conditions may be termed static meteorology, then thunderstorms and the train of attendant forceful weather conditions may be designated dynamic meteorology. A rising column of warm, moist air is the basic cause of all thunderstorms, whether convectional or cyclonic.

Rain and even tornadoes may be produced artificially if the process of forcing warm moist air upward is carried far enough. Vertical, gyratory, and horizontal wind currents of almost unbelievable velocity are produced during different periods in the life of a thunderstorm. Sea captains truthfully aver that almost anything in the line of weather may be expected in a thunderstorm.

Thunderstorms are most common on the west coast of Florida, where ninety occur on an average every year. New Mexico averages sixty, and the smallest number, five, with the least severity, occur on the Pacific Coast. The weather map always shows a thunderstorm region when there is one. Bearing in mind the general drift of such storms, the air pilot should always be on the lookout for their tell-tale cloud formation. Fortunately, the position of low barometer is invariable, and certain clouds are sufficiently definite in their form and character readily to



Thunderstorm clouds too high to be flown over

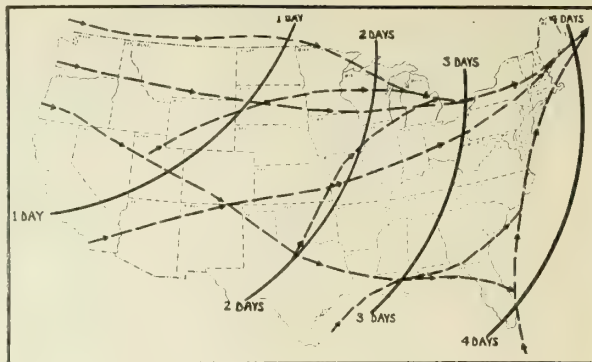


Fig. 1—Storm tracks from east to west across the continent

be recognized by the trained pilot. Roughness of the air associated with thunderstorms is nearly always within the cloud, for there the condensation-convection factors are most intense. Within such cloud masses the temperature, as well as the water content, is high. These "bumps" are intensified by rapidly moving air sliding down a mountain-side. Most aviators know that, on flying toward a mountain range, they run into a "false lift" before reaching the summit. This is invariably followed by a marked reduction in pressure which causes reduced sustentation.

One of the most marked vertical currents so far measured occurred on October 12, 1927, when a mail plane was thrown 1,500 feet in a vertical line. One of the pilots stated in his official reports that vertical currents carried the plane through sudden variations in altitude of more than 1,500 feet. Another mail pilot in the same storm reported that there were moments when the altimeter would record tremendous fluctuations in elevation. Running into a heavy rain-squall cloud whose base would be 3,000 feet above sea level, for instance, the plane would be tossed up to 6,000 feet of altitude, and with the nose pointing down with an air speed of 140 miles per hour, it would hover there, finally emerging from the cloud into another mass of air in a down current almost as violent. John Wise, the pioneer aeronaut, nearly a century ago reported similar conditions in his remarkable "System of Aeronautics." It should be remembered, however, that the altimeter within a thunderstorm cloud is not always a reliable indicator of elevation above sea level, since this barometer fluctuates with the variations of atmospheric pressure within the storm.

Tornadoes are the fiercest storms known to meteorologists, and results indicate that no structure except a monolith can withstand their fury. Therefore, the only

(Continued on page 276)

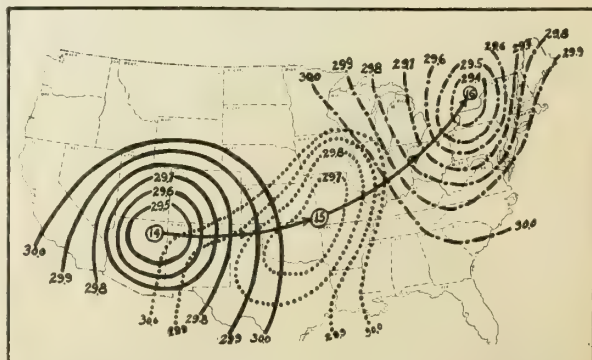


Fig. 2—Progress of a storm area on three successive days

# THERE IS A SANTA CLAUS

By Don Rose

IF there is a point farthest south in the aeronautical year, this must be it.

All that wind and weather and mud and murk and other sorts of meteorological misery can do to discourage the flying man and his trade is being done. The cash customers are coming in out of the wet, and the fly-by-night pilots on the mail routes are wondering why they didn't go into some nice clean business, like undertaking or plumbing. The birds who roost on unfinished flying fields are wondering why they were ever started, and those who work out of first-class airports equipped with everything a pilot could ask, from concrete runways to conveniences for ground flying, are finding that they still need a sky-broom to take the clouds down and sweep off the fog. In other words, it's November.

It's even worse than that. At the time of writing, I find myself exactly at the halfway mark between the devil and the deep sea and between the frying pan and the fire; between Scylla and Charybdis or a couple of other fellows. I can look forward or backward and find the visibility bad in both directions. For this is just about midway between the stock market's tail spin and Christmas,\* and thinking of either of them doesn't make one think any better of the other.

I don't mean to imply that I lost all my money when the bears went on a rampage and chewed up all the little lambs, not to mention the goats. In order to lose money you must first have some, and I haven't seen a nickel in ten years which wasn't mortgaged before it came to live with me. But the mood of Blue Tuesday and Black Thursday was infectious, and I caught it along with the rest of the world. I worried over the market as though it was my own idea. I sweated when Steel went down and whooped when it went up, and hung around the ticker as though I knew what it was talking about. I greeted my friends in the morning with "How's your margin today?" and lay awake at nights wondering what I would do if Simmons Bed should collapse before morning. I rushed to the board to see how American Can was opening in the morning and sneaked back to it to see how Westinghouse Airbrake had closed in the afternoon.

Incidentally, I was wiped out five times during the tough two weeks when the market stepped on one banana peel after another. The day after the slide began I was advised very cordially and heartily to buy a certain stock at 86, said stock having previously done as well as 156, which seems like a lot of money. I didn't buy it, principally because there didn't seem to be \$86 or even 86 cents around the house, but I went through all the mental motions of doing so. Maybe the stock saw me coming and got nervous, or maybe I'm just a poor picker, but next morning that same stock got down to 70. The next day it reached rock bottom at 60, so I bought in again on the same terms as before. But though 60 was the positive bottom for this particular stock, somebody dug a basement under it and it fell into it at 46. So I was wiped out again.

On Terrible Tuesday they found a sub-basement under my stock, and it left me holding on to its tail at 37. And on Thursday it nose-dived again to 28.

If I had really been buying instead of just figuring on the backs of envelopes, I would have lost not only my shirt but my pants and underwear. And when it was all over, I felt very much like the colored gentleman who was just about to be hung. When asked if he had any

last message before ascending the scaffold he remarked, "Well, this is suttinly goin' to be a big lesson fo' me."

I've been wondering for two years whether I was the only man in our neighborhood who couldn't pick winners in the stock market. Everybody else, from the barber to the third assistant elevator operator in our office building, seemed to be in the market and making money. I have discovered at last that though some of them may have made it they never had it, and most of them never will have it now that they have outstayed their welcome in Wall Street. Maybe they weren't as smart as they seemed to be six months ago. They managed to get on the wagon while it was going up hill, but lots of them hadn't sense enough or experience enough to get off when it ran away down hill. Nor had they nerve enough to stick, or else they lacked the wherewithal to pay for the ride. So a lot of them got chucked off, and some of them got hurt.

It's a sad story, mates, and you can lay to that. But it isn't as sad as it seems to be, and now that the storm is over it begins to appear that a lot of the noise came from the sidelines, where people like myself were indulging our natural appetite for gloom and weeping and wailing over a game in which we had very small stakes. If it hadn't been for good business sense at Washington and some grandstand gestures from elsewhere, we might have started a scare which would have given this Year of Grace a black eye for a generation to come.

The trouble is that we learned the language without learning the rules of the game. A hundred people talked market for every one who knew what it was all about. While the wild days were on, you might have supposed that every spare nickel in the country was in New York City, even though savings banks were holding their own, building associations richer than ever, insurance accounts greater than ever before in history, and every American home ten times better fitted out than its equivalent of a generation ago. A lot of the money that was lost or mislaid in Wall Street was the country's spare cash—the sort of money that is bet on horse races. A lot of it was never lost at all, because it wasn't really there. It was fictitious money, imaginary money, money that could never be collected in any quantity without pulling the props out from under the whole dizzy edifice. There were stocks that went up like a balloon and came down the same way when the hot air went out of them. After which we still had the balloon, even though it looked a little the worse for wear.

This is the story the insiders tell, though they choose to tell it in language which sounds as though they were talking big to keep their garters from slipping. The rest of us went around talking about billions being lost in Wall Street as though Wall Street were a hole in the nation's pocket. As a matter of fact, the slump left the country with just as much money as it had before, just as much man-power, just as much work to be done. A lot of people went broke, of course, but people are always doing that. It just happened to be the stock traders' turn. But the elements of prosperity, which are money, man-power and productive labor, certainly didn't depreciate forty-six per cent in the first two weeks of November, even though the market average did. If we all had sense enough to look the other way when Wall Street has an epileptic fit, these things need scarcely be affected at all.

But as I have said

(Continued on page 254)



# AIRPLANES OF THE FUTURE

**T**HOSE who have studied the future needs of regular airlines will agree that twenty to thirty-passenger planes will be the minimum size practical for such a service. Some of the reasons for the use of large transport ships are the growing requirements for safety and the fact that in a short time transport ships must be equipped with radio and instruments necessary for fog flying and fog landing.

We have had small, medium-sized and large aircraft; first the single-engined plane with its limitations; then the ship with two or three motors, the chief advantage of the latter being its increased reliability; now we are coming to the era in which ships having four engines are showing their advantages, and it is significant that planes of this type were constructed by me as far back as 1913.

In studying the qualities of these different types of ships, I believe that the demand for reliability and comfort is increasing constantly, and therefore rapidly leading to the plane with four motors having a total horsepower of 1,500 to 2,500. It seems to me that the use of four motors will give the greatest practical margin of safety and that the use of more engines than four cannot be regarded as adding to the safety of the ship. More than four motors appear merely to increase the complications of installation and manipulation that arise from the employment of a great number of power units.

At the present time the great German seaplane, Dornier Do. X., has twelve engines, but this is because of the non-existence of large power units of known reliability. While four motors seem the full necessary equipment, that number also appears to be the fewest which will combine safety with efficiency. Any further increase in the size of ships, I believe, will be merely an enlargement of the four-motored type to permit carrying more passengers.

Until recently it was thought that planes would never fly safely through fog, but Lieut. Doolittle, working for the Guggenheim Fund, and others have given us brilliant demonstrations of solutions of this most difficult of all aviation problems. We may reasonably expect to arrive at an every-day application of similar fog-flying instruments in the very near future.

The airliner of the future must have a highly skilled and well-trained crew, able to fly a given course in fog or complete darkness. This requirement virtually eliminates the small ship from such a field of action.

Nevertheless, small planes will continue to have a considerable number of uses. Privately owned planes and aerial taxis will come under this classification. In most cases they will not be able to afford radio or numerous costly instruments, or crew. The pilot of such a craft cannot be expected to undertake the extremely complicated business of fog flying. When approaching fog or storm, the thing he must do is fly away

By Igor I. Sikorsky  
Vice President, Sikorsky Aviation Corp.

from it or land at once and wait for favorable weather before proceeding. For this reason, of course, a large number of well-marked emergency landing fields must be provided and the pilot must know where these fields are located. A slow landing speed is also a desirable characteristic for this type of plane.

Of even greater value in this class, however, will be the amphibion plane, and I believe that amphibions will some day be used almost entirely by private owners and air taxi drivers. There are two reasons for this:

First, the usefulness of amphibions and their ability to reach their destinations. Aquatic landing places exist closer to the hearts of all large centers of population than ground landing fields. The pilot of an amphibion has better facilities for taking on and delivering his passengers than the pilot of a landplane. New York City is a good example of this: I know of occasions when people flying to New York in an amphibion plane from Hartford, Springfield and Philadelphia were being driven downtown in taxicabs on Riverside Drive less than an hour after taking off from their respective cities. If they had come by landplane they would still have had more than an hour's train or motor trip to make.

The second reason is safety. Small planes with a single pilot, limited instruments and no radio cannot properly risk flying through fog. They must land. In all cases of forced landings, an amphibion is at a distinct advantage because there are more than twice as many places where an amphibion can get down in most parts of the country. For example, take a thirty-mile strip on a line between New York and Washington. On that strip there are seven and one-half square miles of regular and emergency landing fields indicated on maps, against 550 square miles of water area available for emergency landings. Furthermore, water landings are much less difficult to accomplish during fog or darkness, for no matter how dark it is, the pilot can distinguish a silvery strip of water, and gauge his height above it. A land field, unless lighted, is often extremely difficult to find in bad weather.

To return to large airplanes, I believe the immediate future will see further development of the types now in existence rather than the appearance of radically different types. On routes which are entirely over land, large land planes will continue to remain the logical equipment, because of economic and efficiency advantages, for this type, with a given horsepower and at a given speed, can carry the heaviest load.

By the same reasoning it would seem that a non-am-

phibion seaplane would be the most efficient over all-water routes, and in many cases that is true. In many other cases, however, the amphibion airplane is more advantageous; for instance, even on an all-water route the amphibion landing gear materially improves



The Russian-built four-engined Sikorsky biplane of 1913



and simplifies the handling of the ship in port. Instead of using dollies to get the ship in and out of the water, an amphibion operates under its own power, taxiing up the beach or landing platform. This reduces the necessary equipment and ground personnel, as well as considerably lessening the time consumed in the operation. Moreover, it permits loading and unloading passengers when the ship is on land, a simpler and less expensive proceeding than using motorboats to ferry the passengers ashore, the custom now generally followed where seaplanes are in use.

The amphibion landing gear also presents a substantial added safety feature, not often considered; if the ship runs aground in shallow water, as occasionally happens, the amphibion pilot can lower his wheels and taxi away to deep water and take-off. A seaplane, on the other hand, is in danger in a similar predicament if the pilot remains aground, and he is likely to damage his ship if he attempts to drag it off under its own power.

Finally, for servicing the plane, it is almost always possible to find better and cheaper facilities for overhauling, cleaning and refueling on a regular inland air field than at the water's edge. An amphibion, of course, can take advantage of this, but a seaplane is forced to remain at the shore and use the limited service that may be available there.

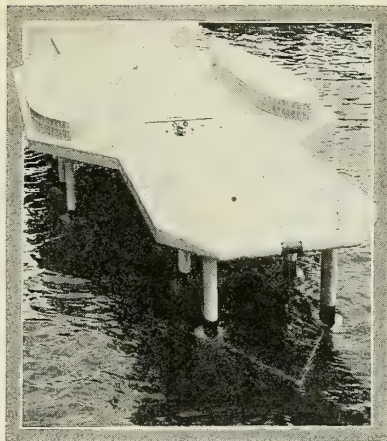
I believe these advantages are sufficient to justify the slight decrease in lifting capacity of the amphibion as compared to the ordinary seaplane. This loss is equivalent to about one and one-half times the weight of the landing gear, because the gear adds a certain amount of drag.

So far as mixed routes are concerned (part land and part water) where terminals at one end may be on land and at the other on water, the amphibion transport is undoubtedly the proper equipment.

The same is true, of course, for such proposed services as the seadrome now being constructed by Edward R. Armstrong, as a halfway landing place between New York and Bermuda, which if successful, will be the first of a chain extending across the Atlantic. Although for this service amphibions will practically always be operated as landplanes, the boat hull will afford a fundamental safety factor.

Over-water flying must be done entirely by seaplanes or amphibions in the future. Landplanes should never be operated over long stretches of water, regardless of how many engines are provided.

I am quite convinced of the soundness and practicability of the Armstrong Seadrome scheme. Of course, only actual experience will show in the future the details of its operation. It is possible that we shall see a



A model of the Armstrong seadrome

wonderfully fast non-stop transoceanic air transport service joining the continents in continuous flight, but such a service will undoubtedly follow the line of seadromes.

Planes will always get their weather information from these floating islands, using their facilities and their radio compasses as navigation aids. Such planes as fly on regular ocean routes will be large enough and sufficiently seaworthy to withstand ocean storms.

There are several flying boats large enough to survive for many days in rough ocean water. Ocean-going airplanes of the future—and in the case of seadromes, these must be amphibions—will be built to withstand all kinds of weather both in the air and on the surface of the sea.

I think the seadrome transport fast mail and passenger ship of the future will be refueled in the air by specially constructed amphibion service planes, which will be stationed on the seadromes and will take off to meet the airliner when informed by radio that the through express ship is approaching.

Although recent progress in aviation permits us to expect the eventual creation of an airplane so efficient that it will be able to fly across the Atlantic and even carry a reasonable payload without refueling en route, it seems that this way will always be more dangerous and considerably more expensive than flying by the seadrome route and refueling on the seadrome or in the air near it.

We may expect a fast daily service between America and Europe for a load of selected mail. Passengers on the regular transport ships, while pausing at one of the mid-ocean stations for meals and service, may have the thrill of watching the fast mail plane roar out of the east or west and pass overhead at 200 miles an hour or more, with a refueling plane attached to its tail and feeding it gasoline and oil through a hose.

To me it appears certain that the seadrome represents the right solution of the transoceanic problem for heavier-than-air machines. Once seadrome lines are established over the world's seaways it will be productive of an enormous amount of fast traffic and will give a great impetus not only to aviation, but to the whole scheme of international relationship as well. Such transoceanic flying will bring the continents about four times closer together. The whole result will be of as much importance to the world as the building of the first railroads was. And this great achievement is just ahead of us—within the next three to five years.

The seadrome may prove to be the only practical solution, for the present at least, of the problems to be overcome if long distance, over-water air transport service is to be maintained with any reasonable degree of reliability.



The first American-built twin-motored Sikorsky of 1925



# The FUNDAMENTALS of WARFARE

By

*by Caldwell*

WARFARE may seem to be an untimely, an ungracious subject to intrude so soon after the friendly visit of an English gentleman with the President of the United States to discuss the limitation of armament. However, in the past, friendly gentlemen have visited the rulers of friendly powers; treaties have been entered into; the populace has applauded loudly the solemn conclaves, the earnestly written documents that were to make peace, perpetual and everlasting peace, a reality. Yet wars have come just the same; and just the same will wars come again.

As I write these words, on November 11, the world is celebrating the signing, only eleven years ago, of an armistice that put an end to hostilities that had extended over a period of more than four years. The war then ended was called the war to end war, since which time there has never been a moment when a war was not being waged on some part of the earth's surface. And the very people who welcomed recently the friendly ambassador from Great Britain are the same people who cheered enthusiastically, only twelve years ago, when American soldiers embarked for a war. Human nature does not change to any appreciable extent in twelve years; the man who could cheer war twelve years ago can cheer peace today—and war again tomorrow. Which is not to make light of these earnest endeavors of nations to understand each other, to make overtures of friendship, to reduce, so far as is humanly possible, the causes of or incitement to conflict; such endeavors are worthy of approval and support. But all such endeavors, laudable in intention and, capable of accomplishing a measure of success though they be, yet are utterly incapable of changing to any noticeable degree human nature itself.

Man, individually and collectively, is today what he was yesterday, what he has been since time immemorial, what he will be for many centuries to come: an acquisitive, aggressive, jealous creature, holding stubbornly to what he has, reaching out eagerly for more. And as the man thinks, as the man is, so thinks the nation, so the nation is. For nations are collections of individuals, masses of individuals; and no mass is of finer stuff than the individual units of which it is composed. When we consider nations and their aspirations, therefore if we would form a true conception of what they are and of what they hope to be, if we are to analyze them, we must cease to think of them as nations, as masses; we must, mentally, break them up into their constituent elements, must consider the individual human atoms of which they are composed.

Man is a grasping creature, eternally reaching out for things; the conditions of Nature force him, as they force every living creature, to *get* things in order to survive. It is instinct with the race: a baby will grasp things with his hands the moment he is born; he will continue to grasp things with his hands, grasp ideas with his mind, through maturity and to his death. It is only death, in fact, that loosens his grip. Even though he be a philanthropist and give much away, yet what he holds until death will be more than he has, of his own desire, let slip.

This condition of man may be called neither good nor bad. It merely IS. Like his feet, it is part of him. More than that, it is like his head. Without his feet he could survive; without his head he could not. Without his

instinct to get things and to hold onto them he could not survive. Without material things, without clothes or food or shelter, he could not survive in northern latitudes; and even in the tropics he could not survive without food. All of these things he must grasp and use if he is to survive.

But grasping things is not of itself enough to insure survival; man must

hold onto those things and protect them from the clutching proclivities of other creatures, other men. And here enters the spirit of competition for there are not enough things in the world to satisfy the acquisitive instinct of man, and everything that is here, everything that ever was here, is and was already in the grasp of something or someone. When prehistoric man wanted meat, he had to get it from the animal of which that meat was a part. He had to tear loose that animal's grasp on life in order that he might survive. Right from the very first he had to fight for what he wanted; and when he got it, he had to fight to protect it from other animals, other men. Even though he may have been partly or largely vegetarian, he still had to fight, if only to protect his wild fruit tree, his berry bush, from the depredations of others. When he became a cultivator, the fundamentals remained the same. He had to grapple with Nature, grasp things with his hands, in order to wrest crops from the ground, wood for his fires from the trees.

When he progressed sufficiently to become a social animal and live, first in families, then in tribes, then in collections of tribes, the story was still the same. The struggle to survive centered about the ability of the individual and the tribe to grasp things, to hold onto them, to protect them from the grasping proclivities of others.

Grasping and fighting are instincts of the race. They are the fundamental requisites of survival. True, we have progressed during the centuries; we have ethics, social customs, religion, knowledge. These things, these cultural accumulations of the ages that make up what we call civilization, tend to ameliorate the hard conditions of our lot. They enable us to live, for much of the time, at amity with our neighbors; they permit us to pass about the world without weapons in our hands, to trade with other men, to exchange ideas with them, to be at peace. But this collection of customs and ethics that makes civilization is no more than varnish covering thinly the surface of the fundamental man we are. Let a nation, one coherent mass of us, affront another nation, a different coherent mass, and we are up in arms with all the ferocity and hate of our cave-dwelling ancestor.

\* \* \* \*

I HAVE thus briefly restated these facts of our existence, not because they are unknown, but simply because they invariably are overlooked or not alluded to when the official representatives of nations meet to discuss peace or war, armament or disarmament. It would, perhaps, be embarrassing to cultured diplomats dressed in formal evening attire and grouped about a friendly dinner table to allude to the fact that the ancestors of everyone present, in order to procure their own dinner, had been forced to leap upon a fleeing deer, brain it with a club, and then brain another ancestor to prevent him from making off with the meat. Yet that is precisely what the prehistoric ancestors of every diplomat must have done, (Continued on page 238)

# LABORATORY METHODS IN AERONAUTICS

IT was little over twenty-five years ago that the art of human flight became an accomplished fact through the culmination of the work of Wilbur and Orville Wright. The victory over the unknown forces of nature followed after a long siege dating back centuries to men who lived so long ago that their attempts to fly are remembered only as legends. Bit by bit knowledge was accumulated, but at the price of human life. The victory came suddenly like the collapse of the camel's back when the famous last straw was added to the load. What was the last straw by which the air was conquered?

Some say that the deciding factor was the development of a gasoline engine of large power and small weight, but the near success of Langley with his steam engine shows quite clearly that this is not the real explanation. It is believed that the deciding factor was the development by Langley, Wright, and others of an experimental procedure using small models; experiments which could be made at so much less expense and so much more quickly and accurately, without risk of human life.

Early airplanes were constructed full size, and tests made by pushing them over the edge of a roof or sending them down an inclined track. Today, the airplane is first tested in two ways. First, all of the parts are tested and checked for structural strength, and the assembled machine tested by loading with sand and by dropping it to the ground from a given height. In the second place, the loads to be encountered and the stability and control are measured by the use of small models. For example, when the Select Committee of Inquiry of the House of Representatives conducted its investigation into the state of the Air Services, a few years ago, many questions were settled by tests of small models of airplanes at the Bureau of Standards, Langley Field, Va., the Washington Navy Yard, and elsewhere. The results of these tests were published in a separate technical volume accompanying the general testimony. The Safe Code for Commercial Aviation, worked out under sponsorship of the Bureau of Standards and the Society of Automotive Engineers by representatives of all groups interested in civil aviation, requires that model tests be made of all essentially new designs.

The models are tested in a wind tunnel, which consists of a long tube of fairly large diameter through which air may be drawn at high speeds by means of a fan. The miniature airplane is held fixed in the air stream by means of wires which are attached to balances for measuring the forces produced by the wind. The forces on an airplane driven through still air by a propeller at a certain



Entrance end of the ten-foot wind tunnel of the National Bureau of Standards

measured. Likewise, the stability may be determined—that is, whether the airplane will tend to remain in even, steady flight when disturbed by wind gusts.

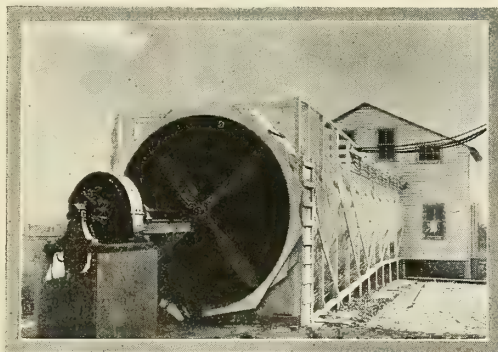
There are three such wind tunnels at the Bureau of Standards, one three feet in diameter where winds up to 150 miles per hour can be produced, one four and one-half feet in diameter where winds up to 75 miles per hour may be secured, and one ten feet in diameter where winds up to 70 miles per hour can be produced. This last tunnel is one of the largest in the world.

There are many interesting illustrations of the value of these laboratory tests. During the war a large 7-winged airplane consisting of three main wings one above the other and a pair of wings in front and a pair behind was built without a model test by a designer who secured funds from private sources. On its trial flight the airplane met with an accident, the nose lifting in the air and the machine

falling back on its tail as soon as the full motor power was turned on. The designer was then persuaded to make a model for wind-tunnel tests at a cost (including the tests) of perhaps one two-hundredth that of the full-scale machine. The wind-tunnel test showed that the air forces were not properly balanced with relation to the weights carried, and certain changes were suggested. It was found impossible to carry these out on the actual machine without practically rebuilding it. A partial rebuilding was carried out at great expense,

but the second attempt at flight resulted in a second wreck. The financial backing was withdrawn and the project was abandoned with no return on the money spent. Had the wind-tunnel test been made first, the project would probably have been carried through to completion, since the suggested changes could readily have been made in the original plans.

The performance of an airplane, insofar as speed, climb, etc., are concerned, can be predicted with amazing accuracy from wind-tunnel tests by a competent engineer. Certain secondary corrections need to be applied for best results. Many people are surprised to learn that after the initial climb when the airplane remains (Continued on page 276)



Motor and propeller at the exit end of the ten-foot tunnel of the Bureau of Standards



# THE FIRST COMMERCIAL AIRLINE

LATE in the afternoon of December 31, 1913, a Missouri Pacific freight car was shunted to a spur running down the commercial dock in St. Petersburg, Florida. Half a dozen of us clustered around it and struggled with our composure while the freight agent fussed over the necessary papers. Literally, that car was a great cocoon, enshrouding a giant moth that was to write a new page in the history of transportation.

In 1912 I had become interested in speed boat racing through handling the engine of a crack racer owned by a wealthy Florida turpentine and timber operator. An interested spectator at the Palm Beach regatta was J. Stuart Blackton, at that time in his prime as a leader in the movie world. One evening during the regatta, he voiced his intention to "bring down some *real* fast ones and take a hand in the sport." I facetiously suggested that if he did, I'd build one that "would lick anything he could produce."

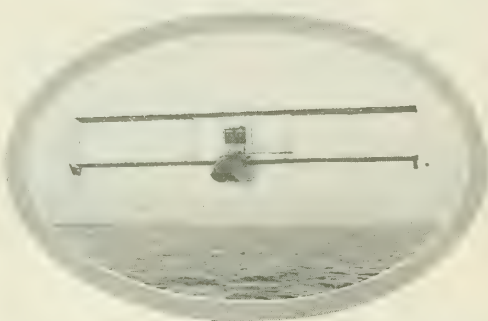
The Jacksonville Power Boat Club planned an elaborate three-day regatta for the winter of 1912-13, and, true to his promise, Mr. Blackton wrote to its officials, early in the fall, that he would enter three of the fastest racers in the North.

I laid down a single-step hydroplane. My newly acquired bride and I built this hull in twenty-one working days and nights—mostly the latter. Due to lack of funds, the boat was completed only on the day before the opening of the regatta, and all of the races of the next morning were pulled off without us. The first race in the afternoon was a free-for-all. We followed twelve boats over the line, but, when we came to the first turn, a mile and half down river, there was only one boat ahead of us. As soon as we had rounded the last of the three buoys, we opened her up and slid into the lead as though the other boat had been anchored. The rest of the story hurts. We began to lap the slower boats and had only two more of the ten laps to go when a stud holding the gear case let go, and we were out of it for good and all.

This experience whetted my appetite for speed, and I began to look about for something that would provide the optimum.

Having heard that Tony Janus made his famous trip down the Mississippi River in a flying boat built by Tom Benoist, in St. Louis, I started

By P. E. Fansler  
*Organizer of the St. Petersburg-Tampa Airboat Line, 1914*



Tony Janus flying the Benoist boat over Tampa Bay

operated, about the only differences being the length of flight and the passenger capacity. I wrote to Tom about the scheme, and he immediately became enthusiastic. He agreed to build and furnish two boats if I would work out the operating details, select a route and handle the business end. My experience all over Florida led me to conclude that a line could be operated between St. Petersburg and Tampa under favorable conditions. The distance was about twenty-three miles; some fifteen or sixteen of which was along the shore of Tampa Bay, the remainder across Old Tampa Bay. There were, therefore, only seven or eight miles of actual open water route.

In St. Petersburg I had a very interesting reaction from the leading business men I interviewed. They thought I had a mighty clever idea, but they didn't believe there was any such thing as a flying boat. I talked a group of a dozen into putting up a guarantee of \$100 each, and the Board of Trade "came in" for a like amount. Considering the millions being invested in airlines today, these subscriptions seem like cigarette money, but in that day almost any piece of Florida real estate, regardless of size, could be purchased for \$100 cash, plus mortgages running into eternity.

Before me is the frayed sheet bearing the signatures of those men who backed the first commercial airline in the world; Noel A. Mitchell, Chas. A. Hall, O. T. Railsback, C. D. Hammond, Arthur Johnson, C. M. Roser, Lew B.

Brown, George Gandy, Perry Snell, G. B. Haines, Soren Lund, G. T. Bailey and L. A. Whitney, acting for the Board of Trade. They agreed to pay us \$50 a day during January, and \$25 a day thereafter, for every day on which the agreed schedule of four trips was main-



Tony Janus and P. E. Fansler (center foreground) at St. Petersburg on the day the airboat line to Tampa was inaugurated, January 1, 1914

tained, minus the receipts from passenger carrying on these trips, provided the aggregate subsidy did not exceed, in any month, one-third of the amount subscribed.

These men were good sportsmen. None of them had seen such a thing as a flying boat, but they were willing to gamble something on the strength of a possible publicity stunt that would direct the eyes of the public towards the Sunshine City.

I agreed that we would open the St. Petersburg-Tampa Airboat Line at ten o'clock on the morning of January 1, 1914, and told the newspaper men all about it. Naturally quite a little excitement was stirred up—this was early in December—and no little ridicule resulted. Many thought it was a hoax.

Although Tom shipped the first boat in ample time to reach St. Petersburg about Christmas, something happened to the car en route. We deluged the freight officials with telegrams. Tony Janus came down to act as chief pilot—a handsome devil, one of the most skillful fliers of that distant age, and always full of ginger. I don't remember the name of the mechanic Tom brought with him, but we called him "Smitty" and his devotion to the power plants was notable.

As the days went by and the car failed to materialize, even the backers of the enterprise began to josh us about the "phantom" boat. The 28th became the 29th, and the 30th passed into the 31st, and—our frantic joy can be imagined when the local freight agent announced that the car had arrived and would be switched down to the dock within the hour. We walked beside that car from the freight yards to the waterfront, to make sure that it didn't go wandering off again. At last it was set. The seal was broken. Smitty and Tom crawled into the car and hastily inspected the contents to see that no damage had been done in shipment. Shipping air boats by rail was new in those days.

Then skids were fastened into place, and slowly and tenderly we lowered the hull to a strip of sand beside the track. Then the wing sections came out. Whitney, a man of great personal charm and one who had not lost faith for an instant, took off his coat and acted as helper. The boat had been flown before shipment, so, when it had been re-assembled, and just before the sun plunged into the Gulf of Mexico, Tony gave her the final inspection and told Smitty to "crank 'er up."

Willing hands laid hold of the wings and guided No. 43, as she was known, into the water. A short taxi to warm up and Tony took off. Ten minutes later he landed on the opposite side of the lagoon where a rough hangar had been erected and announced that we were ready for the start on schedule next morning.

A traveling showman, one known as Johnny Jones, was in town with a carnival. He gallantly agreed to add a real tone to the opening of the line by appearing with his band. The morning paper carried a big spread. The hoax was a reality. The St. Petersburg-Tampa Airboat Line, first

commercial line in the world, would start its first trip on time.

We had agreed that the first trip would be sold at auction, and a professional auctioneer was on hand the next morning when the crowd began to pour down onto the pier that connected with the outer mole of the yacht harbor. Johnny Jones swung down the pier at the head of his band. Smitty and Tony went over the boat with great care. Tom buzzed around like a hen with twenty-one chicks.

At 9:30, with nearly 3,000 people on the mole and pier, Mr. Whitney opened the ceremonies by telling what we proposed to do. Tom modestly told of his development of the boat. I formally declared the St. Petersburg-Tampa Airboat Line opened, and Tony was introduced as the chief pilot. Then the auctioneer got busy. In ten minutes he had sold the first ride for \$400 to Mayor Pheil, after spirited bidding by leading business men. Mr. Pheil explained that he had to buy some machinery in Tampa and had to hurry. I don't remember the names of those who bid in the second ride, or the others for that day. Mr. Pheil in a raincoat stepped gingerly into the boat, which had been

pulled down until it was just awash. Smitty pulled down on the starting bar, and the little Roberts motor that was to prove so reliable began to roar. Tony settled down into his seat and tested his controls. The crowd looked on with interest. Many had never seen an airplane of any kind, and had little conception of what the boat could do. Tony yelled to me for the time, and I told him that he had a minute before ten o'clock. He speeded up the engine and the blast from the propeller upset a small urchin who had been trying to stand against it. Then, with a wave of his hand, Tony gave her the gun and the boat taxied out over the

lagoon to the inshore side. Turning, Tony drove her straight for the harbor entrance, and, before reaching it, pulled her off the water.

The first commercial airline in the world had been started.

Rapidly old 43 dwindled in size, winging her way towards Tampa. The crowd settled down to wait for something. I heard many interesting comments during the next few minutes. Some of the "crackers" opined that "she'd fall into the bay afore she got half across," and I doubt if many actually believed that the trip would be carried out on schedule.

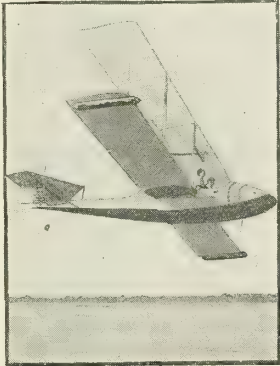
At 10:26 the telephone bell rang and my elation could not be concealed as I heard the attendant at the Tampa terminal—a crude runway built down the bank of the Hillsboro River—say: "Tony's coming up the river, and there's a big crowd here yellin' its head off."

That was all I heard, but it was enough to keep the crowd waiting for the boat to arrive on the return trip. She was due at 11:30, and at 11:20 Smitty, whose keen ear had been trained to pick out the hum of the engine, shouted:

(Continued on page 260)

**SCHEDULE:**

Le. St. Petersburg	10:00 A. M.
Arrive Tampa	10:30 A. M.
Leave Tampa	11:00 A. M.
Ar. St. Petersburg	11:30 A. M.
Le. St. Petersburg	2:00 P. M.
Arrive Tampa	2:30 P. M.
Leave Tampa	3:00 P. M.
Ar. St. Petersburg	3:30 P. M.



**Special Flight Trips**

Can be arranged through any of our agents or by communicating directly with the St. Petersburg Hangar. Trips covering any distance over 100 miles and from the water's surface to several thousand feet high AT PASSENGERS' REQUEST. A maximum charge of \$15.00 per Special Flight.

**Rates: \$5.00 Per Trip. Round Trip \$10. Booking for Passage in Advance.**

NOTE—Passengers are allowed a weight of 200 pounds GROSS including hand baggage, except charged at \$5.00 per 100 pounds, minimum charge 25 cents. EXPRESS RATES, for packages: suit cases, mail matter, etc., \$5.00 per hundred pounds, minimum charge 25 cents. Express carried from hangar to hangar only, delivery and receipt by shipper.

Reproduction of the time-table of the St. Petersburg-Tampa line



# THE UNEXPLORED AIRCRAFT MARKET

## A Suggested Sales Program for Reaching Potential Buyers

By Lieut. Leroy C. Perkins

*Director of Sales  
Lincoln Aircraft Company*

**A**IRPLANE manufacturers are fully justified in being apprehensive about the prospect for sales possibilities this winter and next spring, and even the coming two or three years. No one can deny that, unless they get down to a solid business basis, they will suffer a serious depression. More than anything else, I believe, if the aircraft industry is to thwart overproduction, it must consider some pertinent facts concerning potential markets as related to sales methods.

According to evidence at hand, it appears that little effective selling effort has been developed thus far. Consider, for example, the relative positions of the automotive and aircraft industries. The Aeronautical Chamber of Commerce, Washington Bureau, reports as of September 28th, 1929, but 5,610 licensed and 3,099 identified (unlicensed), a total of 8,709 airplanes in use on that date. A recent survey revealed that there are now 30,000,000 automobiles in use in the United States or one to each four of population, as against 8,709 airplanes or one to each 15,000 of population. Airplane manufacturers produced only 2,854 airplanes during the first six months of 1929, whereas the automobiles manufactured in the first eight months totaled 4,443,450 cars.

On its face value, the comparison is not altogether just, for planes and motor cars do not occupy exactly parallel positions in the field of transportation. Nevertheless, we may properly assume that the sale of one airplane for each 500 autos is within reason and, what is more, within possibility. By such an estimate, we ought now, or in the near future, to have 60,000 ships in use in one capacity or another.

The pitiful showing of the flying industry apparently results from the fact that the tremendous public interest in flying was not analyzed and acted upon in an intelligent manner. While the more superficial aspects of aviation were widely publicized, the general public was not taught to appreciate the essential significance of air travel in its many ramifications.

The manufacturers of automobiles applied sound merchandising principles to their methods. Airplane manufacturers have not!

Obviously, airplanes can be sold only to those who can afford to purchase them, and know how to fly or can employ pilots. With 26,006 student permits granted the first nine months of 1929, and but 8,176 active licensed pilots, there is need for action. Business and professional men, those most capable of buying and maintaining airplanes, cannot, and will not, give up several months of their time, away from their interests, at considerable expense, to learn to fly. Some expedients other than those now practiced must be introduced to afford them instruction. Teaching them to fly must be made attractive, convenient, and interesting.

Although large flying schools are accomplishing a great deal in teaching young men to fly, only a small portion of those students are now financially able to purchase and maintain an airplane, and it will be several years before they, as a class, will be able to do so.

This country needs wide-spread air "service," not just

here and there, as we now have. As of August 31, 1929, there were only 1,485 flying fields. There are more than 3,000 counties in these United States, and two or three fields with hangars

and service should be located in each county.

There should be several thousand automobile dealers handling airplanes, working in connection with the flying fields, already established or planned. The automobile dealers now sell units of gasoline-powered transportation, individually owned but confined to the ground. Without impairing motor car sales, many of their customers can become prospects for the use of airplanes.

A wise airplane dealer would merchandise this new means of travel about as the original automobile dealer sold his proposition to the public. Yet there are some points of variance. The aircraft dealer has a distinct financial advantage over the automobile dealer of twenty years ago, because now the prospect is willing to pay to learn to fly, whereas he was taught to drive an automobile at the expense of the dealer. If he learns to take advantage of each, the airplane dealer will find he has several sources of income: instruction, both ground and flying; sales to individuals and flying clubs; service of supply and maintenance; and taxi and pleasure flights.

With but ten well established automobile dealers in each state operating airplane agencies, giving private license flying courses and generally serving the flying public, there would be a surprising stimulus to sales throughout the entire industry. Such dealers would cultivate and sell the potential prospects on the advantages of this means of transportation and would get results from their efforts.

Literally thousands of business and professional men are anxious to learn flying, with the desire of purchasing an airplane. Perhaps the plane is not quite perfected as a vehicle for business use every day in the year, but when the users understand that a 200-mile trip is but two hours of travel, they will soon adopt it.

We in the industry must get distribution through the medium of hundreds and thousands of automobile dealers. They must be convinced that there is a real opportunity to profit by the business that is only waiting to be had. The pilot dealer has not always proved himself capable of getting as satisfactory results as he might. Indeed, in many instances, he has fallen down on the job completely.

If aircraft manufacturers had given serious thought to the question of sales and not taken a market for granted, they would certainly have developed efficient distributor organizations along with their factories. Of course, a few did do so,—but they are considerably in the minority.

Successful merchandising includes manufacture at a profit, sale of the merchandise at a profit to the distributor as well as the producer, and the satisfactory performance of the merchandise for the consumer, consistent with its original cost and maintenance.

Distributors can operate profitably if they are taught how to organize and function. Manufacturers will be able to build up an industry that will be the envy of all others only when they undertake a systematic and energetic sales program, look at the facts fearlessly, take off their coats, and go to work sensibly.

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## A CALL TO BATTLE

**T**HE predicted cut in the budget for aviation arrived on schedule, in fact ahead of schedule; and what a cut! It affects by almost virtual elimination both the Bureau of Aeronautics and the Army Air Corps.

What are we of the industry going to do about it? Sit still, tremulous with fear lest we be called "lobbyists"? Or are we to wage an aggressive battle for the appropriations to which we are entitled? Are we to shiver in our skins, timorous before the Powers that say they Be, or are we to see to it that the Powers that Really Be understand the facts, know what to do and do it.

Aviation has many friends in the House of Representatives and Senate. In Congressman W. Frank James, acting head of the committee on military affairs, it has a leader in the House able to wage a real man's fight for it. It lacks a leader in the Senate. We once thought we had one in poor Hire-em Bingham, but he is completely washed out. We can acquire a leader there, and it is the duty of the industry to do so. We shall need him during the four years to come, for it will be a continuous battle, not merely a small skirmish now and then, if we are to hold the place that we have won.

Directly and indirectly the moneys pulled away from aircraft manufacturers will exceed twenty-five million dollars. We can't afford to lose that much. We can't afford to lose a cent. The country can't afford to have us lose that much or have us lose a cent. For us to lose it would be for the nation as a whole to lose its guarantee of safety. As an organized industry we have the same right to argue for our goods and sell them to the country that anybody else has to endeavor to convince the national legislature of the value of his idea and product—a better one than most. For our goods are essential to the national security.

The Government in 1929 will spend 741 million dollars for national defense. No fair proportionate share of this expenditure has been allotted to air services. In the event of war, air fighters would have to carry seventy-five per cent of all the burden.

Let Congress devote one-half of the amount allotted to the Army and the Navy to aviation and we would get ten times, and if another war came, a hundred times as much as they in combination could and would. But their old, trained lobbies never have been worried by investigation and we have never had a lobby.

The situation demands immediate action on the part of every person interested in national defense, and of course demands immediate and drastic action by the industry. Not only must the money which has been taken away from us be replaced, but the sum-total must be generously increased so that the nation may be adequately ready for the war which must inevitably come. "In time of peace prepare for war," said Washington. Our only actual preparation for the next war will be that which will make us efficient in the air.

## LAND AND SEA AIR SAFETY

**N**OT exactly a controversy but a good deal of deeply interested inquiry exists as to which one of three generic types of planes eventually will show greatest efficient safety for transport purposes: the landplane, the seaplane or the amphibion.

Forty-four trans-oceanic flight efforts have resulted in twenty successes, with fifty-eight persons starting in the twenty-seven landplanes and forty-nine in the seventeen seaplanes involved. Of the twenty successful planes, fourteen were of the land type, which carried thirty-three passengers safely overseas. The six successful seaplanes carried eighteen human beings.

The twenty-four failures involved thirteen landplanes carrying twenty-seven people and eleven seaplanes or amphibions carrying twenty-nine people.

Thus, in successful flights landplanes have had an advantage, but the landplanes that fell into the sea carried twenty-seven people, of whom twenty-three were lost; while of the twenty-nine carried by seaplanes forced down, only four were lost.

Sixty-five per cent of those who have started trans-oceanic trips in seaplanes, and only twenty-six per cent of those who have started in landplanes have failed of their goal, but the chances of fatalities appear to be as 86 to 15 in favor of the seaplane or amphibion.

The question as to the comparative desirability of the two types for overland flying seems to have been settled in favor of the landplane, although, in fact, across the United States natural facilities for landing on water (lakes and rivers) are at present more numerous and better distributed than developed fields on land. It probably will be long before the nation reaches that situation which the Guggenheim investigators say would insure a very high safety factor for landplanes—a landing field for every ten square miles of territory. But the landplane is superior in weight-carrying, speed and ease of handling.

It would be easy to give further details in favor of either form of plane, but it is clear that present practical opinion trends toward favoring the landplane. If there is a likelihood of a noteworthy change in this mental attitude, no signs now definitely indicate it.

## FLYING REGULATIONS

**T**HE strong appeal of the Department of Commerce for careful and uniform State legislation supplementary to and interlocking with Federal flying regulations should be considered by every State Legislature at its first opportunity. The Department of Commerce can impose its licensing requirements only upon aircraft and airmen engaged in interstate commerce. Others accept the privilege, but compulsion is impossible. In certain states unlicensed and uninspected craft and men fly regularly—if they do not crash, they cannot be penalized unless they cross a state line. It is a scandalous fact that at present some aircraft and some airmen can and do legally fly in certain states without airworthiness or competence. What is it that prevents these states from awakening to the dangerous conditions resulting from unregulated flying.

The Department and all those interested in the progress of the industry know that this situation must be altered either by State laws which require observance of Federal regulations in purely intrastate flying or by the adoption of independent State regulations supplementary of the Federal laws governing interstate aviation.

The Department feels that the simplest way out of the difficulty will be the adoption of State laws requiring all



intrastate aircraft and airmen to be Federally licensed, thus obviating the necessity of State inspection systems.

If a State's constitution does not permit such adoption of the Federal regulations by "reference," it seems possible that such States might formally adopt the Federal regulations in actual duplicate with the same effect. By watching the changes necessitated by developments or altered conditions in the Federal regulations, State legislative committees entrusted with these matters could easily keep constantly prepared to add, subtract, or amend in harmony, thus keeping up to date with ease and without cost.

Another alternative is to provide that airmen and craft not licensed by the Federal Government be licensed by State authorities. The Department of Commerce experts have examined the situation carefully, however, and believe that this probably would be unsatisfactory.

Many of the complications affecting American life and progress are due to lack of uniform State legislation interlocking and coordinating with Federal laws, all being considered with minute, skilled care. It is impossible to imagine any field in which such State and Federal coöperation is to be desired more than it is in aviation, which has taken men and machines across state lines at four miles a minute and often at such heights and in such atmospheric conditions as have rendered their passage as invisible from ground level as the secret processes continually progressing in subterranean depths.

## THE NEW AMERICAN AIR ERA

**I**N the annual report of the Aeronautics Branch of the Department of Commerce, Assistant Secretary Clarence Young calls us the world's leader in aviation.

Since 1926, commercial aviation in this country has increased by more than 400 per cent in mileage. American machines fly 85,000 miles daily, all but 8,000 of which is within our continental boundaries.

Between last January first and next January first we shall have flown 16,000,000 miles, four times the previous year's total. We shall have carried in the year more than 8,000,000 pounds of mail by air as against a little more than half as much in 1928. Nine thousand persons paid to ride in commercial planes in the United States in 1928. During this year 85,000 by December 31st will have traveled by airplane. These figures do not include, of course, military, naval, private, moving-picture, mapping, taxi and several other kinds of flying. These, if considered, would add about 90,000,000 miles to the total of our air travel.

In the near future, sleeping accommodations comparable to the best offered to rail travelers will be available for Americans who fly their journeys so that they may get them over with. Major Young predicts that within a few years every large city in the country will be on a regular line of air transport. Some of the finest airports in the world now are being developed in America.

Against our total of about 16,000,000 miles Germany will have flown during the year, 6,300,000; France, 3,700,000; Italy, 1,236,000; Great Britain, 873,000; the Netherlands, 1,007,000, and Switzerland, (Europe's smallest nation) 330,500.

Major Young predicts air postoffices which will pick up, sort en route and deliver mail as the railway postoffices do now—air service for through travel including sleepers to equal any railroad service ever dreamed of—constant radio telephone communication with the flying

passengers—airports of such extent and splendor as are unknown elsewhere.

And Clarence Young is not a dreamer.

Vincent Bendix of the Bendix Corporation, coming home from Europe, feels sure of incomparable American progress. He talks from knowledge. For the first nine months of 1929 Bendix earned a net of just about \$9,000,000.

## NAVIES ARE AFRAID OF AIR

**I**T is interesting to note that Smuts and Jellicoe have come out with frank admissions of the superiority of air as a weapon of offense. But these wise old-line fighting men now both admit far more than the American Congress does; they fully acknowledge the potential effectiveness of the air arm; Jellicoe, clever old naval man, hoping against hope for and urging air disarmament. What else could save the navies? "Oh, for those good old days before we could be bombed from the air!" say all the Navy men throughout the world. But Jellicoe admits: "Danger from the air is greater than anything else." Smuts, a grand old soldier, cried at Geneva, while also urging air disarmament: "Air forces, growing rapidly in many nations . . . . constitute a greater danger than purely military armaments." "Air force," he declares, further, "means ruthless warfare, not against the armed forces of the enemy, but against civilian populations, with consequent destruction of cities and peoples behind the lines."

Air disarmament, when generally agreed to, would be most desirable no doubt. When other powers make up their minds to it, America will join them with a will. But while it now is being urged by Smuts and Jellicoe, the nations (as they both say, not mentioning, out of politeness, that America is the exception) are all heavily increasing their air forces. Every member of our Congress should read and heed these speeches of Jellicoe and Smuts—especially should they read between their lines. And then they should vote for adequate air defense for this richest and most envied nation in the world.

## AND WHY NOT THE AIR LEADERS?

**P**RESIDENT HOOVER, with characteristic ability to get at the root of things, has called the nation's various great business leaders down to Washington for consultation with regard to the astonishing business situation which permitted a manipulated panic in the stock market of the world's most prosperous nation. His general idea is competent and Hooveresque, of course. Call all the leaders into conference and snatch out of panic the most splendid, profitable, constructive calm—energetic, steadily progressing and creative—this great land has ever known. But why, Mr. President, only the railway leaders? Study the figures in Major Young's report, referred to elsewhere on this page, and find that the leaders in the management of our great airlines are already comparably important in the nation's transportation. Why not invite them, also, Mr. President, to be present at the conference? They may have things to suggest, as means of prosperity creation, which the heads of railways (able men no doubt but associated with devices of a previous generation) never would conceive. Invite the air heads, also, Mr. President, help the nation and incidentally, give the rail heads a real opportunity to learn. A conference of the sort without the heads of air transport lines would be Hamlet without Hamlet. And be sure to get the heads—not the pretenders.

# DYNAMICS of SOARING FLIGHT

By H. Hartshell



THE National Advisory Committee for Aeronautics, Technical Memorandum No. 183, dictates the following:

"It is possible to say

at once, with perfect definiteness, that it is not now and will not at any time in the future become possible to soar without power in still or steadily moving air. That would be perpetual motion nothing more nor less."

The logic leading to this edict is not supplied. Since neither the N. A. C. A., nor anyone, has supplied reasons for this dogma, so widely believed, it is interesting to give the subject a logical investigation.

Quoting from J. Clerk Maxwell's "Matter and Motion," Article II: "In all scientific procedure we begin by marking out a certain region or subject as the field of our investigation . . . . In physical science, therefore, the first step is to define clearly the material system which we make the subject of our statements. This system may be of any degree of complexity." Quoting now from Article III: "All relations or actions between one part of this system and another part are called internal relations or actions. Those between the whole or any part of the system and bodies not included in the system are called external relations or actions."

When any particular physical problem is brought under investigation, the number of independent bodies whose action on each other is of an important magnitude is determined by the facts. The problem is accordingly classified as a two-body system, a three-body system, a four (or more) body system, as the case may be. Events in a two-body system may be expressed with the greatest of ease in terms of mathematical equations. As the number of bodies of the system increases, the system becomes increasingly difficult to handle mathematically. The system of more than two bodies ordinarily must be solved by adding together the results of a number of two-body solutions, sometimes accompanied by the introduction of approximations.

The force on an airplane in flight results from the mutual action of its wings and surfaces on a limited portion of air in its vicinity. The interaction of these two masses does, of course, result in motion of the airplane. There is, in addition, a gravitational stress between airplane and earth acting in effect between the center of mass of the airplane and the center of mass of the earth. The gravitational stress of the airplane may or may not be balanced by the mechanical stress between the mass of the airplane and the mass of a small portion of air.

The mass of air on which the airplane acts is in gravitational equilibrium. This may be explained by the motion of the air molecules. The gravitational force on any portion of air is completely cancelled by the acceleration of its molecules. There is accordingly in effect no gravita-

tional stress between the portion of air and the earth. It has no tendency to fall.

Since the mass of the earth can and does contribute to the

motions of the airplane in flight and the mass of air acting on the airplane is not similarly or equally affected by the earth, the earth must necessarily be considered as an internal body in the dynamic system of motions and actions of heavier-than-air craft in flight. The number of bodies whose action on each other must be considered independently in solving the flight problem is three: the mass of a portion of air, the mass of the airplane, and the mass of the earth.

Quoting again from Maxwell's "Matter and Motion," Article LXIV: "The motion of the center of mass of a system is not affected by the mutual action of parts of the system." This precept also determines the dynamic system applying to heavier-than-air craft. Its fulfillment requires consideration of the earth's mass as an internal body of the system. From a point outside of the system, as the airplane moves up, the earth must move down to maintain the momentum equation and position of the center of mass of the system. The mass of the earth's atmosphere is, of course, part of the earth's mass. The statement would hold true if the earth were composed entirely of atmosphere with no solid nucleus.

The inference is clear that airplane flight is a three-body problem.

A general statement of the principle of the conservation of energy may be quoted from Maxwell, Article LXXIV:

"The total energy of any material system is a quantity which can neither be increased nor diminished by any action between the parts of the system, though it may be transferred in any of the forms of which energy is susceptible."

"Perpetual motion" implies contravention of this principle. The transfer of energy from wind to airplane to sustain its flight within the three-body system is certainly in attune with this principle.

If it were true that the airplane in flight and the air surrounding it constituted a complete dynamic system, neither body of which was affected separately or differently by any body outside of this two-body system, the energy of a uniform wind involving airplane and air in a uniform motion would, of course, not be available to sustain the flight of the airplane.

The flight of heavier-than-air craft is not merely the mutual action between craft and air. It is the action between craft and air to oppose the gravitational action on the craft.

Since the earth is an internal body in the dynamic system, there always remains the possibility that, as the result of some mutual action

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# AIR—HOT AND OTHERWISE

**W**ITHIN a few weeks the members of the Aeronautical Chamber of Commerce will be called upon to elect officers for the coming year, and, as in years of yore, a mimeographed announcement will be sent to each dues-payer notifying him of the date. On the morning of the election (as heretofore) a small (very) interested (well rather!) group will arrive at the offices, most of them late. A nominating committee will be appointed by the chair. It will retire for an hour or so. Returning, it will announce the nominations in accordance with a slate previously prepared by those most concerned.

This has been the procedure since the Chamber was formed. A little bird chirping on my window ledge tells me that this year the nomination committee will be in active operation a full month or more in advance of the election. This is as it should be. Wouldn't be surprised if we had Fred Rentschler to thank. Last year it had approximately five hundred members. Less than forty were at the meeting to select the great minds which during the ensuing twelve months (the current year) were to guide its course amidst the storms of politics and through what should be busy, rapidly flying days of constructive workmanship for the good of the air industry.

The success of the aeronautical industry in some measure is dependent upon the intelligent administration of the Chamber. Membership has more than doubled during the past year under Fred Rentschler's careful and fair guidance. Nineteen-twenty-nine, which soon will have passed, has been the biggest year in the history of American aeronautics. Nineteen-thirty must be bigger still, and in order that every opportunity for expansion may be grasped, it is essentially necessary that all members of the Chamber should give careful attention to the choice of its officers for the coming twelve months.

Its president, its treasurer, its governors, and its executive committee should be chosen with extreme intelligence and care and with no thought except the best interests of the industry. The by-laws that were written at the time of the Chamber's formation should be re-written in many details to meet the changed conditions of today. The executive committee should be enlarged. More A governors should be provided and fewer B's. The Chamber should have the minimum, not the maximum of associate and sustaining governors.

You gentlemen of the air industry, yes, even you gentlemen of the stock market who have come into the industry while the coming has been very good (and there are some who classify themselves as in the industry who are devoting far more time to manufacturing, buying and selling stocks than to manufacturing and selling airplanes), write this election date in large red characters upon a piece of paper and then paste that piece of paper in your hat. Or, better, on your desk-top. Then at the meeting see to it that officers shall be elected who truly represent your industry in all its phases, men who can and will so carry on the work as best to serve the general interest. This is fundamentally important at this time. Coöperation never will exist unless it begins, like charity, at home. If you want 100 per cent coöperation from the other members of the Chamber, for the sake of your own business, you must give the same kind of coöperation for the sake of the other

*Re-elect Rentschler  
Poor Publicity Tom  
Armistice Night*

**By Frank A. Tichenor**

fellow's business. That must mean a hearty general effort to stimulate the Chamber and that must mean election to office of those who can command respect both by the work which they have done and by such present service in their jobs as indicates that they

intend to maintain the hard-work gait. No individual, no small group of individuals can prepare a slate that will inspire generally satisfied coöperation of a real majority of the Chamber's membership.

We are well mounted and not across the river. Not the best time to swap horses. By all means, if you can, prevail upon Fred Rentschler to accept another year of service. It would mean a sacrifice for him, but we would gain, so we shan't mind that, and his record indicates he is big enough to not mind it.

If he finds it impossible for any reason to continue in the job which he has filled so admirably, go West with a fierce, grim demand for the services of Harris Hanshue, president of the Fokker company. The West deserves large recognition, anyway. It is doing more than its share in developing the industry.

Hanshue is blunt. But he gets things done. He fears nobody. He is a thinker who usually thinks straight and thoroughly. He would inspire confidence, and like Rentschler, would insist upon fair play for every member of the Chamber. His force of character would rally every branch and unit of the industry into united effort. Perhaps the Chamber needs the spirit of the West and Southwest as much as it needs anything. It would temper it as the Lord tempers the wind to the shorn lamb (and of such just now heaven knows the nation has enough, and the industry its share after Wall Street's various nose-dives), and it would temper it as the expert tempers steel—a very different process and one also needed. In more than one detail the Chamber needs hardening. Hanshue would demand much and would get a little more than he demanded—or find out the reason why.

Whoever's name is written on the slate for this position, it must be that of someone real. Again, gentlemen of the industry, we urge that this election be taken very seriously. The Chamber has important work to do. Only careful selection of its officers will ensure for the immediate future a better record than the past year has shown.

**O**LD BINGHAM! After the investigating committee made up of his peers had finished spanking Hiram of the N. A. A., right on his Senatorial person, along comes Tom Hill of the American Society for the Prevention (beg pardon, Tom, the word really is Promotion, isn't it?) of Aeronautics who wants the National Aeronautic Association, the Aeronautical Chamber of Commerce and the Aircraft Manufacturers' Association all searched for bootleg and concealed weapons and their aims and general psychologies all audited by expert accountants and analyzed by the Bureau of Standards' longest syllabled chemists. He says a study of this sort would reveal a "super lobby," boldly, badly backed by the unscrupulous money kings of the Air Game (or Gang). He says the lot of us have most unworthy political, financial and social affiliations, and since he never has been able to get any, good or bad, of any one of the three sorts, he is sure it should be

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# WITH AN AERIAL CAMERA IN MEXICO

By Sydney Bonnick

Photographer, Mexican Division,  
Fairchild Aerial Surveys, Inc.

(Illustrations by Fairchild Aerial Surveys, Inc.)

AERIAL photographers often find themselves operating in unusual places. The nature of the business requires them to go where others dare not, or cannot go. Where the painful contortions of nature have created such havoc with the terrain that the strongest and best-equipped surveying expeditions are powerless against the barriers that face them, there you will hear the drone of a giant engine and see the methodical back-and-forth progress of a photographic airplane. That is the modern method of survey.

But the photographer, crouched over his camera in the vibrating cabin of the airplane, has neither the time nor the desire to contemplate the beauties of the jagged mountain range below. He and the pilot are fighting the crazy air currents which haunt the valleys and the peaks; trying to get the pictures and get back to their field before the gas tank runs dry; doing their best to keep from freezing in the sub-zero temperatures of altitudes around 20,000 feet. The life of an aerial photographer is not the dizzy round of pleasure that many persons believe it to be. And when the territory to be photographed lies 450 miles south of the permanent base, and in the midst of the most inaccessible regions of Mexico, the photographer realizes he is in for trouble.

I knew, in a general sort of way, what I was up against. I had come back to New York last winter after a successful survey of about 2,400 square miles of mountains and jungles in the vicinity of Tampico, Mexico. I had established a little base there; built my own buildings and done all my own darkroom work, and thought I knew all about aerial photographic conditions in Mexico. I had just gotten acquainted with my family again when an assignment reached me in January of this year, directing me to the Isthmus of Tehuantepec, which is an extremely isolated section of the Mexican backwoods. I had to pack hurriedly and report at Farmingdale, L. I., from which point we were to take off in a new Fairchild 71 on the first leg of the long journey south.

My pilot was George Kraigher, who served in the Serbian and French aviation services during the World War and who has been flying ever since. A better flier I have yet to find. Cool, keen and alert, he proved his uncanny skill at the controls many times during our experience in Mexico, as he had many times already since our first flight together five years ago. He is a particularly uncommunicative sort of chap, who acts first and talks about it afterwards, and as we loaded our luggage and equipment into the plane that Sunday morning, January 13th, George uttered only a monosyllable or two. But the twinkle in his eye told me he was looking forward to the adventure as much as I.

Taking off slowly with the heavy load, we headed south

along the mail route. By the time we had arrived at Washington, D. C., a gale had sprung up which slowed our speed down to a mere crawl. We averaged sixty miles per hour for the 420 miles to Greensboro, N. C., which we finally reached after a seven-hour battle. The next morning, however, the weather was

ideal. We made our scheduled trip to New Orleans without incident. And this was the last bit of fair weather we encountered for many a hectic day.

There had been three days' rain at New Orleans when we arrived there, and we staggered off the muddy field after our visit with only enough lift to clear the obstructions. Forty minutes after leaving the airport we ran into a terrific rainstorm, and of course Kraigher did the right thing and turned back, only to find the storm had closed in behind us. Driving sheets of rain hammered against the cabin windows; a thick fog was rolling beneath us and totally obscuring the ground. Returning to New Orleans was, therefore, a hazardous procedure, and we decided to push on into Texas and try to make either Beaumont, or Houston.

Kraigher came down as low as he dared, and we flew along over the tops of the few trees we could see through the wall of fog, hoping to pick up a clue to our direction. We finally picked up the Southern Pacific tracks and came down still more to about fifty feet, Kraigher flying with one wing down in the railroad cut to give us a slightly better view of the ground. There was no forward visibility whatever. I had both front windows open and was drenched to the skin, but I had to keep by head stretched out of the window looking for tall trees and high tension wires.

I distinctly recall a fleeting glance of a tiny village on the Texas border. A man was coming out of a house fastening his raincoat around his ears and apparently saying to himself: "What a rotten day to be outdoors," when he looked up and saw us loom out of the fog and disappear again. His dazed expression almost shouted at us: "Well, you're bigger fools than I am."

After two hours of this hair-raising business, I had the good fortune to spot a hangar, and there was a name on it: "Orange, Texas." Another minute or two and we were on the ground, taxiing through mud up to the axles of the

undercarriage, on a privately-owned airport as big as any in New York State. To me it was the most beautiful field I had ever seen! That mud certainly felt good, even though it was so thick it came over the tops of my high boots. Incidentally, there were 6.4 inches of rain there that day.

We stayed there over night and attempted to dry out a bit before continuing to Brownsville, the next stop on



The Fifth Avenue of Mexico City, Mexico





The National Palace and Cathedral Mexicale

our itinerary. The ship was not damaged to any great extent by the ravages of the storm, and the trip to Brownsville was made without excitement, except in one case where Kraigher suddenly pulled the ship around in a vertical bank and shouted: "Quick—get your camera out. There's a dry field!"

We made Brownsville in three and a quarter hours, settling down gently on the new municipal airport there; one of the most famous in the country and one which is destined to become a great international port as the volume of air travel between the United States and Mexico develops in the future. It holds the key to Mexico for all airplanes coming from the Middle West or Eastern part of the United States, and the excellent service to be had there reflects great credit on its live chamber of commerce, which has been active in its development.

Shortly after we had landed and climbed out to stretch our legs after the long ride from the private field at Orange, Tex., we were informed that there was some additional equipment there waiting for us to pick up, in addition to some passengers. The first to greet us was a woman, the wife of one of our pilots already in Mexico. Then followed two burly young men who were to be added to the staff of pilots of the Mexican Aviation Company. Altogether, the ship was carrying Kraigher, the lady, the two new pilots, myself, two big Fairchild cameras, view-finder, camera-mount, three film magazines, fifteen rolls

of film and all our personal baggage, in addition to the full fuel load. I have often wondered since how we ever got off with that load, but Kraigher managed it somehow.

Crossing the international border at a fairly low altitude, the Fairchild droned down the coast of the Gulf of Mexico; over long stretches of yellow beach, innumerable tiny inlets and coves, desolate and bleak rock-bound cliffs. Not a sign of life anywhere. This is one of the most deserted regions on the North American continent, and during the several trips I have made along this inhospitable coastline I have never seen any signs of habitation at all. I don't believe there is even a muskrat for five hundred miles.

Engaged in deep contemplation of this phenomenon, I was startled by the sight of the one feature I had been dreading, a sea fog rolling in underneath us right down on the ground. It was as opaque as a brick wall. We could not hope to follow the coast line to Tampico in the face of an obstacle like this, and there was no landing area anywhere in the territory, as I knew by bitter experience. The situation called for quick action, and Kraigher, who had seen the rolling clouds of gray mist as soon as I, banked around immediately and headed north again.



Looking down on the Sierra Madre mountains

In a few minutes he was skimming the ground, looking over a grassy field which he had mentally noted while passing over it a short time before. Swinging wide and heading into the wind, he brought the heavily-loaded monoplane down in a gentle arc and landed easily in the high grass. We all got out of the cabin, lighted cigarettes and waited for the fog to pass over before attempting the balance of the coastwise trip.

There was some consolation in the thought that this ground was rarely seen and hardly ever visited by human beings. We speculated on this in a half-hearted tone; and when it was exhausted as a subject of conversation, we reached for more cigarettes and stood in bored silence. The fog grew thicker. Someone wondered whether it would clear before the next morning.

After being marooned in the marshy field for four and a half hours, however, we saw the fog disappear as suddenly as it had come. Then came the thrill of the



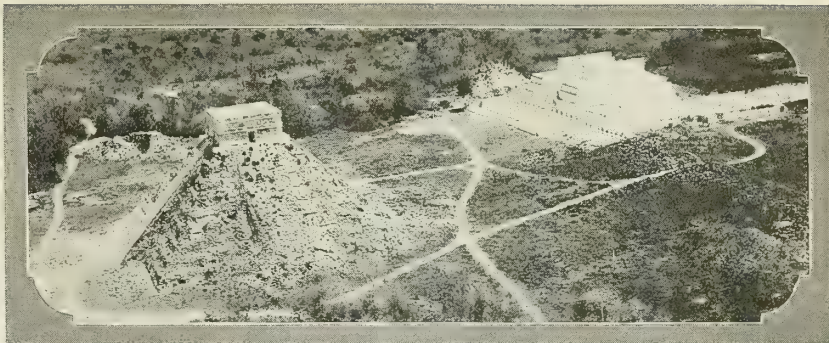
The beautiful Chapultepec Castle at Mexico City



take-off with the heavy load, and the bigger thrill of landing at Tampico and hearing the roar of planes being warmed up to go and look for us.

Leaving our passengers and part of our cargo at Tampico, we took off again the following day for the really interesting part of the journey, which would lead us to the newly-established base far to the south, where we arrived a few hours later. From an aeronautical point of view it was terrible. It was a mountainous, swampy nightmare, with jungle creeping up from all four sides. We had just enough room to get into the field, and not a foot more. There was only scant evidence of civilization among the inhabitants of the region, and unfriendly Indian tribes (of whom the company officials told gruesome stories) lurked in the hills beyond.

In a brief period of rapid construction we prepared the base for the actual work of the survey, and after a preliminary reconnaissance flight over the area, we set to work



Maya ruins at Yucatan, Mexico, which are being restored

Fairchild people about how long one of these ships will float if the motor cuts out?"

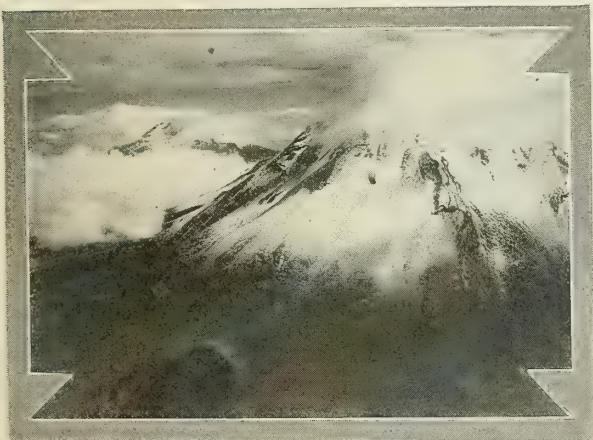
In the survey work we flew at altitudes between 13,000 and 15,000 feet, and, of course, wore parachutes. We wore them and never had to use them, but I often wondered, up there, which was the best choice—if we were to come down in the water and make a meal for the sharks or to drop down gently into the trees and provide dessert for the boa-constrictors. It seemed to me that parachutes would only prolong the agony.

Early one morning Kraigher came rushing around to my quarters and burst in, aglow with excitement.

"Shake, old man!" he exclaimed. "We're in the war again. Look!"

I jumped up and peered out of my window. Through the open doors of the hangar I could see a guard of eight Mexican federal soldiers surrounding our plane, standing stiffly at "parade rest" with their rifles against the toes of their boots at precisely the regulation angle.

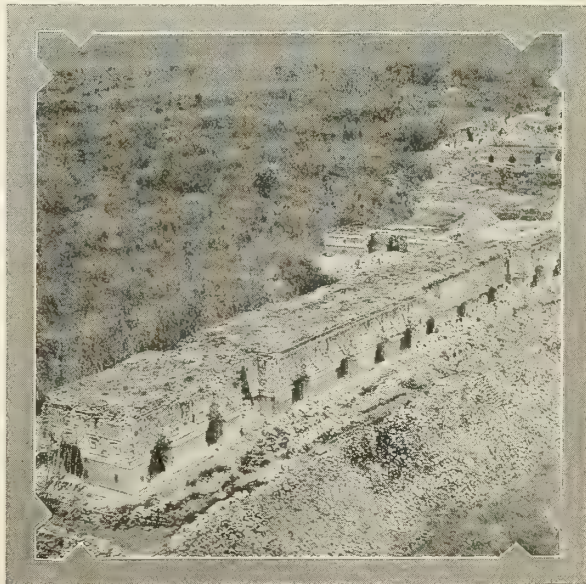
We couldn't gain anything by rushing, so we sauntered over to the officer who seemed to be in command and learned that he had special orders from the general in command of the district to the effect that, owing to the outbreak of a revolution we would be "grounded" until further notice. He assured us, however, that the plane would be closely guarded and protected in every way. There being nothing we could do about it, we busied ourselves with the accumulated (Continued on page 272)



The snow-capped summit of Mount Popocateple

in earnest and covered a large portion of the work on our first day's flying. The area to be surveyed comprised some 1,500 square miles of weird-looking country—as far as we could see from the rather extreme altitude of 15,000 feet, there was one succession of mountain ranges after another. Tiny snake-like streams wound back and forth in the midst of a solid mass of jungle. The wall of vegetation crept high up the rocky sides of the peaks. In the few clear spaces visible, we saw the glistening reflection of stagnant swamp water. Past the farthest mountain range was the sea, and in the hope that there might be a beach there to use as an emergency field, we visited it to investigate. We found no beach, but we did see a number of sharks. I took up my camera and besought Kraigher to fly down near the surface in the hope of getting them to pose for a few pictures. We were about ten miles from shore and fifty feet over the water, dodging and circling in the attempt to catch one of the man-eaters in time to get a picture of him. We approached quite close with no apparent interest on the part of the shark; then there would be a swish, a plume of spray, and he had vanished. After about six attempts of this kind, Kraigher leaned back and asked, confidentially:

"Say, Bonnick, did you ever get the dope from the



Some of the Maya ruins at Yucatan



# MUCH ADO AT ABERDEEN

THOSE who attended the eleventh annual meeting of the Army Ordnance Association, held at the

By C. B. Allen

Aberdeen (Md.) Proving Ground, October 10, were conscious immediately upon arrival that the airplane was being given a more prominent role than ever before in the big "shoots" the purpose of which is to measure whatever progress has been made in the development of war machines. It seemed not so much a radical reversal of policy, or even the admission of the inferiority of older methods, as the inevitable, though gradual, acceptance of the heavier-than-air flying machine as an arm of the first importance in almost every branch of warfare.

Evidence of the changed order of things was first apparent in the large number of airplanes assembled on the flying field that has long been an indispensable adjunct to the Aberdeen war laboratory. There were fast pursuit ships from Selfridge Field, Mt. Clemens, Mich., huge bombers from Langley Field, Va. (including both Keystone Panthers and the new Curtiss Condors), and swift attack planes from Mitchel Field, L. I. In addition there were a number of Army, Navy and Marine ships in which high-ranking officers, members of Congress and Cabinet officials had flown from Washington, and a few civilian planes which brought the total of visiting aircraft up to nearly half a hundred. Nor were the most of this eagle brood there merely for purposes of transportation and exhibition; they were to play an outstanding and impressive part in the Ordnance's show.

There was, of course, the usual amount of firing on the various ranges by small, medium-size and large weapons, a sham battle in which tanks of all sizes and speeds snorted grotesquely across the landscape for the benefit of 15,000 visitors, while a handful of the "vanishing infantry" (in the sense that the foot soldier is disappearing more and more within the bowels of protective war machinery) followed in their wake to mop up whatever resistance might be left behind. Much of this demonstration, particularly the part featuring the lighter and more mobile tanks, created quite an impression among those who witnessed it. The Christie tank was probably the most spectacular of all the mechanized equipment, dashing spectacularly about on the rough surface of the "battlefield" at speeds up to forty miles an hour while the startled on-lookers were assured by an expert at the loud-speaker announcing system that this same machine, stripped of the self-laid caterpillar tread that allows it to go cross country with such abandon and speed, was capable of burning up the roads to or from any battle front at sixty-five to seventy miles an hour. Next to it in speed, and seemingly somewhat sturdier in construction, was a new light tank, developed by the Army, which carries a two-man crew, a Browning machine gun and a rapid-fire one-pounder automatic rifle. This machine demonstrated its ability for sustained operation at thirteen miles an hour, as compared to six or seven miles an hour by the best World War tanks, and in emergency spurts attained a speed of twenty-two miles an hour. Tractors, armored cars and motorized gun carriages, all of various types and sizes, completed this phase of the show and emphasized that the "next war," when and if it comes, will put a premium on speed and armored engines of destruction into which the infantry almost entirely will disappear.

All of this served as something of a prelude to the speed and striking power of the most modern war weapon

of all—the machine which the Wright brothers gave to the world a quarter century ago. Following lunch there was

a brief meeting of the Army Ordnance Association at which Benedict Crowell, president of the organization, spoke on its aims, purposes and activities; Senator Hiram Bingham, president of the National Aeronautic Association, gave an address on "Making America Air-Minded"; Major General C. C. Williams, Chief of Ordnance, discussed "The Status of Army Munitions"; and Harold C. Smith, president of the National Metal Trades Association, discoursed about "The Metal Trades and Preparedness." The experts and the mere lookers-on then repaired to the "main front" to see the Air Corps do its stuff. Major General James E. Fechet, Chief of the flying branch of the Army, was in the crowd and the khaki airmen did him proud.

A trio of Curtiss Hawks from the First Pursuit Group came down in a howling dive from the zenith, their double-mount machine guns beating a devil's tattoo around the targets simulating a column of enemy troops, a gun crew or a machine gun nest which it was their mission to wipe out. They flashed in and out of range of whatever resistance might have been offered so quickly as to offer almost no target at all; and it was obvious that their deadly fire had raked the objective far more accurately, and efficiently, as well as with incomparably greater expedition, than would have been possible with ground machine gun units, guns, tanks or any other weapon, assuming that the latter could have been brought to bear on moving enemy troops, a feat that airplanes seem capable of accomplishing practically whenever they wish. The attack was repeated again and again, perhaps for the purpose of having its real significance sink in on those old-school warriors and strategists among the spectators who are still reluctant to accept the airplane as the outstanding military weapon of the age.

The pursuit planes were followed by heavy attack ships, bristling with machine guns and equipped with light fragmentation bombs, to complete the work of destruction on an enemy still paralyzed from the swift preparatory onslaught. The mission of these machines was comparable to that of a light field battery, but the results were far more direct and immediate. They found their own targets with amazing swiftness and proceeded to destroy them with the same dispatch, unhampered by the gunner's handicap of firing most of the time at a target he cannot see. They came in low—just over the tops of the trees and hedges—in the old "contour chasing" approach, giving the make-believe enemy no opportunity to concentrate on them with machine guns or other weapons until that last fateful moment when they were dead upon their foes and drenching them with a shower of bombs and bullets. And there seemed no doubt among the watchers as to where the advantage would lie in such a situation if the conflict were real instead of mimic.

But all this was only preliminary. The pursuit and attack planes having demoralized the ground forces into a state of at least temporary helplessness, a flight of six bombardment planes now came over at high altitude and with deadly deliberation let go three 300-pound demolition bombs each. The projectiles dropped like a flight of arrows through the mild autumn air, and the earth shuddered under their almost simultaneous detonation on the bombing grounds two

(Continued on page 236)

# SAFE AIRCRAFT COMPETITION

IN this period of lull between mergers and the launching of new transcontinental airlines interest naturally turns to the Guggenheim Safe Aircraft Competition now nearing its close with seven planes undergoing their tests at Mitchel Field out of a score or more expected to enter as late as last spring. The search for the fool-proof plane which will enable "anyone" to become a flier is a tempting subject for speculation, a little less tempting—but not much—for the man who is beginning to learn something about building airplanes and almost without attraction to the practical engineer versed in the mysteries of aerodynamics and concerned with production and sale problems, and the Department of Commerce qualification tests instead of those of the Safe Aircraft Competition.

The rules of the competition were enough to stop a number of designers who when the contest was first announced publicly stated that they planned to build a plane for it. Ambassador Harry F. Guggenheim, president of the Fund, and his advisors worked out a set of rules for the qualification tests which were about the most rigid that ever confronted a designer, and the plane or planes that pass them will have done something to entitle it to consideration as a safe airplane.

Rule one says that the aircraft must maintain level flight and controlled flight at thirty-five miles an hour. It must be able to glide for three minutes with power switched off at a speed not to exceed thirty-eight miles an hour.

The plane must come to a complete stop within 100 feet of the spot where its wheels first touch the ground on landing, and before coming to this stop it must glide in steadily over a thirty-five foot obstruction and must be down and still within 300 feet of the base of the obstruction. Next the aircraft must take off in a run of 300 feet or less and then must clear a thirty-five foot obstruction 500 feet from the starting point.

These rules have been printed before but their very stiffness is a temptation to recite them all as a help in visualizing just what Mr. Handley-Page, Burnelli, the Curtiss engineers, "Shorty" Schroeder and the others have set out to do.

Here is rule Number 5: "To test its ability to approach an uncertain landing place in the event of engine failure, the aircraft, with all power switched off, must glide at an angle of not more than eight degrees to

By Lauren D. Lyman



Wide World Photo  
Twin-engine Burnelli metal plane

the horizon; and must also be able to glide at an angle of not more than sixteen degrees to the horizon at a speed not greater than forty-five miles an hour."

There are four more of these qualification tests. The planes must fly at forty-five miles an hour for five minutes with "hands off." They must not fall into a stall and dive if the power should be cut off in a zoom. They must descend on a steep glide at not more than forty miles an hour with the power switched off and the elevator control pulled back to the limit, under perfect control.

Enough has been quoted to show something of what the competing designers are facing with their experimental fool-proof planes. These rules also explain why out of twenty-seven entries there are now but seven planes in the hangars at Mitchel Field. As AERO DIGEST goes to press, another plane, the Johnson Helicopter, is on its way from Milwaukee. J. C. Johnson, who developed the plane, hopes to

make a late entry in the competition although according to the announced rules he is too late by several weeks.

Two autogiros were entered, one by Pitcairn Aviation and another by La Cievra Company, but at the last minute both Cievra and the Pitcairn company decided not to send their planes to Mitchel Field from Philadelphia because they felt that they were "not quite ready."

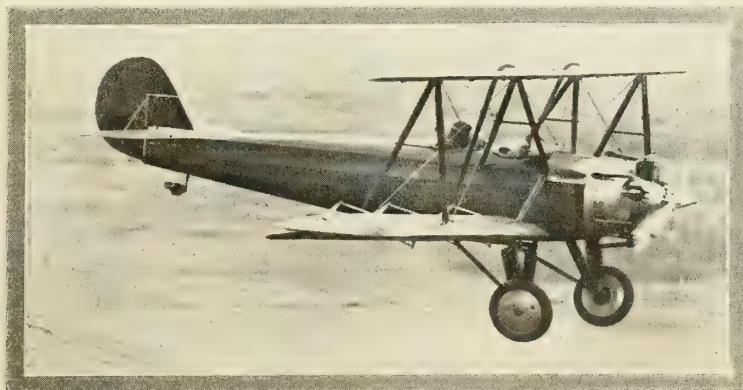
Three planes after coming to Mitchel Field were withdrawn by their owners and three more were disqualified before they had passed preliminary tests.

Two planes were partially disabled while they were being flown by the designers at Mitchel Field.

On November 21 Major Schroeder was testing his interesting monoplane with the variable camber wing with special attention to an experimental aileron adjustment. He had just taken off and had climbed to about 300 feet. His left wing was low and for some reason which "Shorty" could not explain, just after the accident, he could not get it up. The result was a spiral into the ground. Schroeder averted what might have been a serious

accident when on finding that he could not raise the left wing he depressed it still further, tightening the spiral so as to avoid the post hospital. It was a nice bit of flying. The fact that Schroeder was unhurt is a tribute to the design and construction of the odd looking fuselage, as well as the pilot's skill.

The next day



Cunningham-Hall entry in the Guggenheim Safe Aircraft Contest



J. S. McDonnell, who arrived from Milwaukee in his two-place low-wing Warner Scarab-powered monoplane but two days before, lost most of his stabilizer while in a power dive at 2,000 feet. The plane slipped into what McDonnell afterwards described as "an odd outside loop" and much to the pilot's surprise straightened out and began to fly although with rudder tightly locked by the folded stabilizer.

The pilot, who had about decided to take to his chute, changed his mind and brought it down. With lateral control only, he almost made a perfect landing but the plane struck a pile of concrete blocks, crumpling up the right wheel, one wing and the propeller. It is unlikely that either Schroeder or McDonnell will be able to make repairs in time to put them back in the competition before it closes at the last of this month or during the early days of January.

Of the seven remaining aircraft, the planes entered by Taylor Brothers of Bradford, Pa., and that of the Bourdon Aircraft Company are closest in design to the conventional flying machine.

The Taylor Brothers monoplane is a parasol cabin plane equipped with means of varying the angle of incidence. Little was known of its performance up to the time of going to press. The rear pair of struts from a superficial examination appear to be connected through the fuselage and are movable by a lever arrangement, thereby raising or depressing the wing. The Bourdon craft is a two-place monoplane with little to differentiate it from the sport type planes one sees nowadays on every hand.

Of the others, three feature the slots, and by means of flaps, all five have virtually variable camber wings.

Mr. Frederick Handley-Page is here himself to watch the tests of his biplane. He says little about it, preferring to await the results of the competition. His plane, aside from its use of the Handley-Page slots and an elaborate system of flaps, is a conventional type open cockpit two-place biplane powered with an Armstrong-Siddeley Mongoose air-cooled radial motor developing 150 horsepower. Both upper and lower wings carry slots and flaps and they work automatically.

In his development of the slot, the British designer started with one that could be controlled by the pilot. He then found that the apparatus could be made to work automatically; that is, it would go into action as the plane reached the stalling point, and he settled on this type which has been widely adopted. In his flap arrangement he has followed the same principle. By means of push rods and lever arrangements within the wing, the wide flaps are connected to the slots, and when these open the flaps are pulled down increasing considerably the wing camber.

Although no official announcement has been made, it is known that the British entry has already passed a number of its qualification tests. Mr. Handley-Page has sought to build a plane not only for the Guggenheim Safe Aircraft Competition but one which with little further modification he can place in production for the commercial market.

Also equipped with slots and flaps is the Curtiss Tanager, and the slot arrangement to the casual observer is very like the Handley-Page. The flaps, however, extend full length along the trailing edge of both upper and lower

wing and the ailerons of the full floating type are placed at the tips of the lower wing.

In another important feature it differs from the Handley-Page in that though the slots work automatically, the flaps are controlled by the pilot through a crank and sprocket arrangement to a shaft through the wings and thence to horns almost buried in the connecting edge of the flap.

The plane is powered with the Curtiss Challenger air-cooled 170-horsepower radial motor. It has a wing span of 44 feet and a constant chord of five feet. It weighs 1,900 pounds empty and with a useful load of 900 pounds, it has a total weight loaded of 2,800 pounds.

Its oleo landing gear and tail skid are built to provide unusual travel for this

type of plane, and the wheels can be drawn up slightly both while the plane is on the ground or in the air.

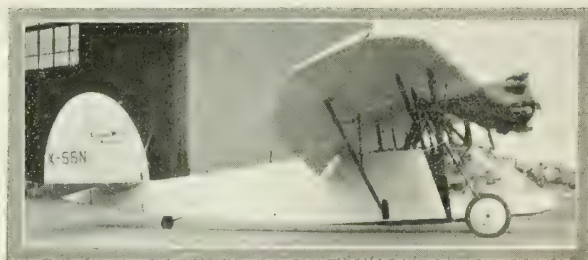
The Ford-Leigh entry is the Brunner-Winkle Bird two-place open cockpit biplane powered with an OX-5 motor. Mr. Alfredo Leigh, the Chilean engineer and designer, has equipped this plane with his own conception of the slot. Just above and a little ahead of the leading edge of the upper wing he has placed a narrow auxiliary wing which extends the full span of the upper wing. It is fixed in respect to the wing, and according to pilots who have flown the plane with the attachment, this "fixed slot" adds greatly to the lift, postpones the stalling moment and otherwise improves the flying qualities of the plane without appreciably cutting its speed. In other respects the plane follows the conventional Brunner-Winkle design.

Vincent J. Burnelli, designer of the old Remington Burnelli two-motored biplane and the new Burnelli twenty-passenger all-metal monoplane, has the only-metal entry in the competition. In many ways it is the most radical plane entered. The monoplane wing not only has a variable camber, but by means of a sleeve arrangement, has a variable chord. Built about a rigid spar through the center of the wing the leading and trailing edges can be drawn in or pushed out, and at the same time, the trailing edge is depressed or raised, giving the effect of the flap, although perhaps to a somewhat lesser degree in the competing flap-equipped planes. This arrangement is worked by a wheel in the cockpit. The plane is arranged for two pilots sitting side by side. The fuselage is typical of the Burnelli design, wide and flat and curved to aid in the lift. The ailerons are at the wing tips and are closed at the ends with thin duralumin flanges.

Burnelli has designed a four-wheeled landing gear, the wheels arranged in tandem pairs. He has utilized the Musselman tires and has covered them with duralumin pants or streamliners.

The plane is powered with two Cirrus Mark III four-cylinder in-line air-cooled engines which develop a total of 180 horsepower. After appearing at Mitchel Field with his plane, Mr. Burnelli returned it to the plant at Keyport for further adjustments and test flying, planning to fly it back to Mitchel Field the latter part of November.

The last plane in the list to put in its appearance at the competition headquarters was the Cunningham-Hall entry from Rochester, N. Y. This plane was ready on the date set for all entries to be on hand, October 31, and it was through no fault of the designer R. F. Hall, vice president



The Schroeder-Wentworth monoplane

and chief engineer of the company that built it, that the plane did not arrive at Mitchel. Test Pilot Paul Wilson was flying it down from Rochester when near Utica the propeller shaft snapped off. Minus his propeller Wilson landed the plane safely in a pasture and brought it on by truck. A new Walter 85-95-horsepower radial motor was ordered from abroad at once and arrived about the middle of the month. Meanwhile, under the supervision of Mr. Hall himself, the plane was assembled in the Visiting Ships hangar at Mitchel Field.

Mr. Hall has built an interesting looking two-place flying machine, which he describes as an "inverted sesquiplane." The upper wing consists of a leading edge and the ailerons about equal in area with a chord of but twenty-four inches. It is a trifle shorter than the lower wing which has a span of thirty feet and a chord of six feet. This wing has a Clark Y section built upon two duralumin spars; one directly behind the leading edge of rectangular cross section and the second of circular cross section to provide a shaft about which the trailing edge flap operates. It is braced with dural and steel tubing.

The variable lift feature is obtained by a system of flaps on the under side of the main wing. The front flap opens into the wing at climbing angles, providing a gap into which the air is drawn. This action forces down the trailing edge flap, providing both an escape for the intruding air and the added lift by the increased curvature.

Although this wing is not made with the slots, it is the belief of the designer that there is no practical reason why the slots should not be used effectively in conjunction with it.

Empty, the plane weighs 1,200 pounds. It carries a useful load of 450 pounds and has tanks for twenty-one gallons of gasoline and thirteen gallons of oil.

The planes in the Safe Aircraft Competition have in one sense proved disappointing; especially to those who looked for some radical departure from the conventional in design or the proving of some hitherto untested or undiscovered aerodynamic principle. In this connection, it was especially disappointing both to the sponsors of the competition and to outsiders who are interested in it, that the autogiro has not put in its appearance. The whole aeronautical world is interested in the Cierva invention. Some engi-

neers have hailed it as a great step in aviation. Others have been and are still skeptical. Pilots also are divided in their opinions of the windmill airplane.

Whether or not it could win the grand prize of \$100,000 or one of the five \$10,000 qualification awards is not as important in the eyes of the aviation world as whether or not the autogiro in competition with the more conventional type of plane would make a good showing. The Fund certainly has provided a competent and unbiased set of judges whose opinion, had the autogiro been presented, would go far toward establishing this plane in its place at the present stage of development.

As a matter of fact, two autogiros were built for the Daniel Guggenheim Safe Aircraft Competition, one by Pitcairn Aviation of Philadelphia, and the other by Juan de La Cierva himself. At the last minute it was decided that the planes were not ready for the competition and that further private tests and adjustments should be made before they might be displayed in open competition against the conventional plane equipped with such modifications as slots and flaps and wings with variable camber.

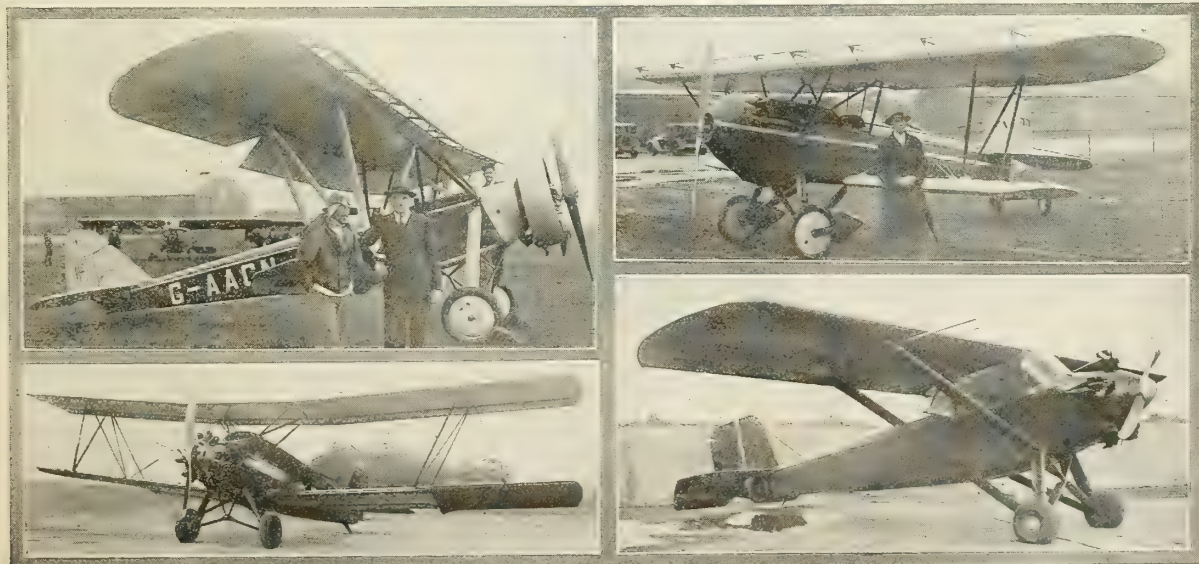
Speaking of slots, Mr. Frederick Handley-Page just before his departure for England before the end of November seemed on the point of starting suit for patent infringement against the Curtiss company for its use of the automatic slot in the Guggenheim entry.

The Fund's attitude on this question was simply that it was not interested in patent infringements. It was interested only in the development of a fool-proof plane.

Officials of the Curtiss company said that they had looked over the Handley-Page patents and were yet to be convinced that these patents were air tight.

"We would welcome such a suit," one official said. "If it is shown that there is an infringement, we can pay royalties. We are not protesting against Handley-Page's infringement of our patents in his entry, although we notified him of five patents which we control and which definitely cover features incorporated in his plane."

As this final installment is being written, it is learned that J. S. McDonnell will attempt to repair his plane provided the Competition committee will give him a month to build a new right wing. His plane was not as badly damaged as it was thought directly after it was smashed.



Handley Page with automatic wing slots (upper left); the Brunner Winkle modified with slots (right); the Curtiss company's "Tanager" with slots and wing flaps (lower left); Taylor Brothers' "Chummy" (right)





## BOOMERANGS MADE SIMPLE!

**P**ERHAPS you have never considered the boomerang as a type of flying machine. Perhaps you have never seen a boomerang, or you may have believed that they were too difficult to make, requiring special wood, special skill to throw. If you have never seen a boomerang in operation, you very likely thought they were just another myth like Daedalus and Icarus with their home-made wings. Boomerangs are so easily made and are so fascinating to experiment with, that we believe you will find this study an interesting diversion from regular model airplane building.

There is another reason why we wish to study the boomerang. It is certain to give us an insight into the workings of the very remarkable Autogiro, which is a type of aircraft obtaining its support from a rotor, which resembles a giant propeller revolving on a vertical axis. We know you will want to make a model of the Autogiro which will actually fly.

Your Junior Activities editor has been studying this machine at the Pitcairn factory

### A FASCINATING SPORT— MAKING AND THROWING BOOMERANGS

By R. E. Dowd

in Philadelphia, where the inventor, Mr. Juan de la Cierva, is busily working out improvements. So let's get the boomerang principles fixed in mind by making one and trying the different throws.

Boomerangs are believed to have originated with the Aborigines, being best known in Australia. Little is known of the actual invention of the boomerang, but it is believed to have been developed from wooden swords, which were thrown at adversaries or game when they were out of reach. It was then probably discovered that by rounding one surface more than the other longer "flights" were possible. In this manner the boomerang was developed to a degree of perfection which is marvelous.

There are two general types of boomerangs—the return and the non-return types. The latter type was used in warfare by the Aborigines. A battle formation consisted of lining up the opposing armies in two long columns. Using only shields for protection the boomerangs were hurled back and forth. They were used by both armies in common. This system surely had its economical advantages from the standpoint of weapons, but what a wonderful opportunity was left open for the strategist to slip some return type weapons into the hands of the enemy!

One has only to throw a heavy Australian boomerang to realize its possibilities in warfare. It is made of naturally curved "ironwood" which is so heavy that it sinks readily in water. On one occasion while perfecting a throw of an Australian boomerang, I suddenly found it charging straight for me on a clean-cut return. Needless to say, when the missile arrived I wasn't there!

The return type is the object of our study, so without further delay we will refer to Fig. 1, which shows an assortment of forms.

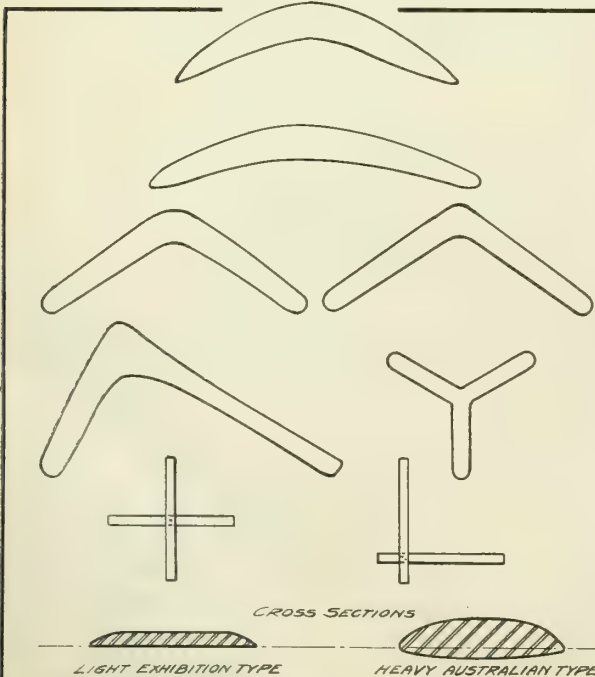


FIG. 1  
VARIOUS BOOMERANG FORMS

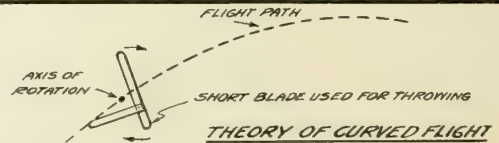


FIG. 2

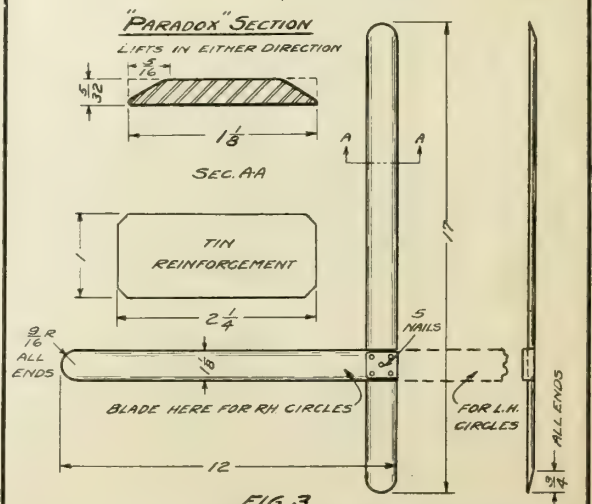
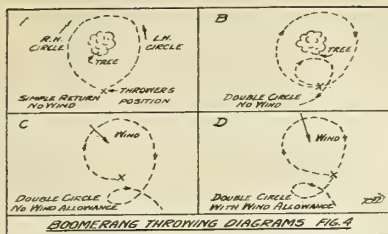


FIG. 3  
AN EFFICIENT 3 BLADE BOOMERANG



Note that some have two blades, some three, and others four. However, in all types the basic principle of operation is the same. See Fig. 2. As the boomerang advances through the air the outer blades have a velocity of the boomerang *plus* the velocity of rotation, while the inner blades have this forward velocity *minus* the rotation. This causes the outer portion to lift more and consequently the boomerang banks around in a circular form. Gyroscopic force stabilizes and directs the course in true circular form, subject only to the influence of prevailing winds. So much for the history and the general information about boomerangs. Now let's make one. It is simpler than making the simplest airplane. The materials required are:

- One soft wood yardstick  $5/32" \times 1\frac{1}{8}"$ .
- Five small flat-head nails.
- Strip of tin  $1" \times 2\frac{1}{4}"$ .
- Sandpaper.

Now refer to the drawing Fig. 3. Study it carefully and you will save time in the end. Next select two sections of the yardstick, one seventeen inches (17") and the other twelve inches (12") long. By selecting these sections it may be possible to avoid some knotty or rough spots in the grain. The edges are planed as shown in Sec. AA, which makes a wing section known as the "Paradox" section. If a plane is not handy a knife will do. The portion of both blades at the joint will be stronger if left full section. This can be done without interfering with the flying qualities. The ends are next rounded and the flat surface carved upward as shown, similar to the wing tips of our Yardstick Sailplane, described in the September issue of AERO DIGEST.

After sandpapering smoothly, we're ready to assemble. If you have any preference in the direction of circle R.H. or L.H. note how the shorter blade should be placed on the longer blade. The strip of tin is bent around the blades as shown and nailed through. If the nails are too long just clip them off and then clinch them over, taking care to flatten them down so they won't cut your hands when you catch the boomerang on the return throw.

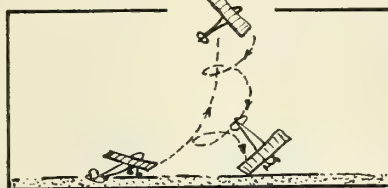
Like any other thing that flies through the air, whether it be a projectile, a great transport plane, or a bit of thistle down, a boomerang in flight is affected by prevailing winds. In order to obtain the best results, it is therefore necessary to practice in a calm or to take into account the prevailing winds. Fig. 4, diagram A, shows a simple return around a tree. It is very likely that a slight twist in the blades will be necessary to make the boomerang return properly. It is not necessary to carve a pitch in the blade as in

a propeller, just simply give the blades a twist with the hands. The twist is, of course, positive in angle because the leading edge of the blade as it rotates is elevated. It will be found that the greater the pitch or twist, the smaller the circle, and also that the rotation does not last so long. This point is readily understood when we remember that the resistance increases with the angle of flight.

Apparently this slight twist is the only reason why we can not throw the same boomerang in both right-hand and left-hand circles. The blade position, as mentioned before, is more a matter of convenience than a necessity, since if the twist is properly changed a boomerang can be used for either direction of throw.

Diagram B, Fig. 4, shows a double circle in calm air accomplished only by throwing the boomerang with greater power.

The effect of a moderate wind on our boomerang is shown in diagram C, Fig. 4. As might be expected, the wind has caused the boomerang to drift so that its circular path is considerably distorted. Under these conditions, the only way to make a return throw is to change the starting position relative to the wind direction so that the flight path, even though distorted, crosses the starting point, enabling the thrower to catch it in mid-air—diagram D, Fig. 4.



Sketch showing effect of tail-heaviness

After you have learned to throw your boomerang skillfully you can have loads of fun with the boys. First they will think you are some sort of a magician. Then as they learn your secrets, they too will be making boomerangs. Then you can have contests such as circling a tree and returning to your hands, or you may want to take shots at each other, taking care, of course, to cover up your head and face. Another stunt, which is really uncanny, is to throw your boomerang at night and just cover up your head and face and wait for it to whiz by close to you or land at your very feet. Let's hear all about your stunts and your success at boomerang throwing, for there is certainly no flying thing which can be made so easily and which will give you as much fun as a boomerang.

Here are a few high spots to remember:

- 1.—How was the boomerang probably invented?
- 2.—Name the two types.
- 3.—What is the "Paradox" wing section?
- 4.—What determines the direction of the circle R.H. or L.H.?
- 5.—What is the basic principle of the boomerang?
- 6.—What type of aircraft most resembles the boomerang in action?

Don't forget we'll have a flying model of an Autogyro in the next issue.

CORRESPONDENCE from readers of Junior Activities is always welcomed. Send accurate descriptions and clear photographs of your models or gliders. Whenever the subject is of general interest, and space permits, such items will be published. Please enclose stamps for reply to your letters and be sure to write your name and address clearly. Address Junior Activities Editor.

#### A. Swan, Jr., Builds Autogyro

"... The flying model I made was, of course, the 'Spirit of St. Louis.' I built the wing up of bamboo, made an elaborate dummy engine and later found out after I had destroyed it that the propeller was on backwards. I guess you will think I was pretty stupid, and I certainly was. It, however, lifted from the ground, went straight up until it fell off on the right wing and spiraled down on its nose like this. (See drawing.) After about a dozen changes and trials I took it to pieces.

"I used the body to build an Autogyro with, by lengthening it. I am enclosing a picture of my Autogyro. . . .

"A. SWAN, JR.,  
"98 Hammersmith Ave.,  
"Toronto, Ont., Canada."

Good work and more power to you. The Autogyro looks like a real fine job. We suppose it is not a flying model and therefore you will want to build the one described in the next issue of the AERO DIGEST.

That trouble with the "Spirit of St. Louis" is so common, let's analyze it. It climbed too steeply because it was tail heavy, due to trying to carry out the scale of the large machine. The center of gravity should be about  $\frac{1}{2}$  back from the leading edge of the main plane. After climbing so steeply it stalled and then the torque of the propeller caused it to fall off on one wing.

#### Aspires to Become Glider Pilot

"... If I ever get a chance to go over to Germany I am going, and when I get there try and hold me back from their two world famous gliding schools. They sure are the boys that can glide, And How! Gosh! America or any other country will have to go some to 'pull down' the records that Germany has 'tacked up.' . . .

LEON BONOTAUX,

14 Birchwood Rd., Glen Rock, N. J.

That's the spirit, Leon. We all hope you will attain your goal and soon be a "three bird" glider pilot and then will go after some of those records with the same enthusiasm that you have written into your letter.



A. Swan's Autogyro scale model



# THE ITALIAN AERONAUTICAL INDUSTRY

By B. De Ritis  
of the Italy-America Society

**T**HE first Italian airline was inaugurated in April, 1927. Although Italy arrived late on the scene of airline development, she has been able to overcome the handicap and today holds a prominent place in European aeronautics.

A rapid development of airlines in Italy, comparable to that which has taken place in Germany and in France, has been impeded by the natural conditions of the country. The Alps and the Apennines and the fogs in the Valley of the Po are serious handicaps. The Italian lines joining Rome with the great centers of the country and joining northern Italy with foreign capitals must, in every case, overcome the mountains, the passage of which is made difficult by winds and fogs, which make it necessary to fly at very great altitudes.

In spite of these difficulties, the Italian network of airways increased from 2,370 miles in 1926 and from 2,910 miles in 1927 to 5,359 miles in 1928. At present it is composed of seventeen lines as follows:

Triest-Turin .....	371 miles....	five hours
Triest-Zara .....	172 miles....	two hours
Rome-Genoa .....	266 miles	
Rome-Palermo .....	396 miles	
Brindisi-Athens-Constantinople ..	890 miles..	eleven hours
Rome-Venice .....	316 miles..	three hours
Venice-Vienna .....	322 miles....	3½ hours
Ostia (Rome) Terranova-Cagliari.	316 miles....	3 hours
Brindisi-Valona .....	80 miles.....	1 hour
Rome-Milan .....	322 miles....	4 hours
Rome-Barcelona .....	670 miles....	10 hours
Rome-Tripoli .....	750 miles....	7 hours
Tirana-Scutari (Albania) .....	58 miles....	50 minutes
Tirana-Koritz (Albania).....	77 miles.....	1 hour
Tirana-Valona (Albania).....	62 miles.....	1 hour

Experimental flights have been made between Genoa and Alexandria, Egypt, to join the English line from London to India.

The following figures show the progress made by Italian civil aeronautics with no accident to any passenger:

	1926	1927	1928
Passengers transported ....	4,000	9,000	15,629
Baggage and freight in lbs..	89,954	307,600	501,700
Mail in lbs. ....	3,450	14,718	21,600
Miles flown .....	324,335	823,146	1,229,881

Every great Italian city has an airport, and every important city has fields that can be used for emergency landings. In Rome in April, 1928, one of the greatest modern airports of the world was opened. This airport can be used both for airplanes and seaplanes. Fields are being prepared and experiments are being made for night flying on the more important lines.

Italy is subsidizing the civil airlines to the sum of 50 million lire a year.

Most of the planes used were designed and constructed in Italy.

Recent agreements made between England and France will permit Italian aviation to spread its network even farther afield, and to connect itself with the European system.

## The Italian Aircraft Manufacturers

The Italian aircraft industry is represented by the following groups:

Aeronautica d'Italia. This firm is affiliated with Fiat. It constructs several types of planes, such as the biplane Cr. 20, the observation monoplane, the B.R.2 bombardment biplane and many others, including the little A.S.1, a light monoplane two-seater.

Aeronautica Macchi. This is one of the oldest companies, having been founded in 1912. It is known for the N.39 which won the Schneider cup in 1926, and for the M.52 which holds the world's speed record. It is also constructing the C.R.20 and the light biplane two-seater M.70.

Cantiere Navale Triestino. The aviation factory forms a separate section of the naval docks and constructs training planes as well as planes for sport, military and transport use. The training planes are for the company's own school at Porto Rose and the commercial ships for the Torino-Trieste and the Trieste-Venice lines. Among the planes built are the Cant.7, the Cant.250-CV, and the Cant.18. These are two-seater seaplanes of the biplane type; there is also the Cant.10, a civilian seaplane for four passengers; the Cant.22, a trimotor seaplane for 9-12 passengers used on the Trieste-Budapest line; and the Cant.26, a light touring plane.

Costruzioni Meccaniche Aeronautiche. This company was started in Marina di Pisa in 1923 and built the first Italian metal planes. At present it produces the Dornier Wal, twin-motored plane, which is largely exported.

Officine Ferroviarie Meridionali. This is the most important firm in Southern Italy. It has an Aviation Section which constructs a two-seater biplane for observation with a Jupiter Romeo motor.

Societa Idrovolanti Alta Italia. This firm constructs the following planes designed by Signor Marchetti: S.55, a twin-motored monoplane with double hull. This was used by General De Pinedo for his Atlantic crossing. The S.59, a single-engined two-place biplane, seaplane, with a central float; the A.S.63, a one-seater twin-engined ship with double hull. These are civilian planes for passengers.

Societa Italiana de Costruzioni Aeronautiche Ernesto Breda. This group was organized at the end of 1917 to build 600 bombardment planes. The planes being built at present are: the Breda A.4, the Breda A.7, the Breda A.9, the Ro.1, all of which are landplanes for training and observation. There are also several excellent experimental planes.

Societa Caproni. This company is one of the oldest Italian firms. At present it builds the Ca.73, a biplane for night bombardment, with two motors and carrying four persons; the Ca.97, entirely built of steel tubes, which can be altered to be either a mono-motor, a bi-motor or a trimotor; and the Ca.100, a light tourist plane.

Societa Piaggio. This firm builds Dornier-Wals. Recently it has introduced a light tourist plane, the P.9.

Among the smaller firms are the Gabardini, which builds two-seater training biplanes; the Cantieri Aeronautici Bergamaschi, which also builds planes for schools, and the Societa Aeronautica Italiana, which carries out repairs.

## Italian Engine Manufacturers

The firms that construct engines are:

Isotta-Fraschini. This automobile firm turned its attention to aviation engines in 1908, and at the end of 1924 commenced research on

(Continued on page 108)

## Dust Raised by Planes Annoys Westchester

### County Threatens to Close Airfield Unless It Stops

Special to the Herald Tribune

WHITE PLAINS, N. Y., Aug. 21.—

With the filing of two more complaints against the dust raised by airplanes on [redacted] Airfield, at [redacted]

[redacted] District Attorney, of Westchester County, threatened today to close the field unless steps were taken to abate the dust nuisance.

Residents of the vicinity of the field protested for the last several weeks against the propellers of planes on the field kicking up clouds of dust which were considered annoying in summer when windows are open.

[redacted] and [redacted] who live across the state road from [redacted] Airfield, complained today to [redacted] Chief Assistant District Attorney, and said that the situation has continued for more than a year, despite repeated conferences with the field officials.

[redacted] conferred later with [redacted] who said he would wait several days and that if the field were not closed other steps would be taken. [redacted] dust, he would close the field. [redacted] started [redacted] three [redacted]

—New York Herald Tribune,  
August 22, 1929.

# TARVIA puts an end to flying dust and gravel

WHEN a Tarvia pavement is down *it stays down*. The dust hazard simply doesn't exist on Tarvia runways, aprons and approach roads.

Propellers do not whip up dust to annoy pilots and passengers. There is no flying gravel to do serious damage to motors and wings.

Barrett engineers know how to utilize local materials to build smooth, firm, dustless Tarvia aprons and resilient, skid-safe, all-weather Tarvia service roads and runways at a cost within the limits of almost any airport budget.

All the 25-year paving expertness and country-wide service of The Barrett Company is available to the airport engineer. 'Phone, wire or write our nearest office.

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St. Louis	Minneapolis	Boston
Detroit	Cleveland	Birmingham
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Providence	Syracuse	Milwaukee
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Lebanon	Youngstown	Rochester
		Bethlehem

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# Chronology of Some of the Important 1929 Aeronautical Events

## JANUARY

**1st**—The *Question Mark*, an Army trimotored Fokker powered with 225-horsepower Wright Whirlwind engines, took off from the Los Angeles Metropolitan Airport on an endurance refueling flight.

**2nd**—Comdr. Byrd on the South Pole Expedition explored the Bay of Whales and vicinity from the air.

**6th-9th**—Army, Navy, Marine and civilian fliers competed in the events at the All-American Air Meet held at Miami. William S. Brock and Lee Schoenhair made non-stop flights from Detroit to the meet in 9 hours and 25 minutes. Each piloted a Wasp-powered Lockheed monoplane and carried passengers.

**7th**—A record endurance refueling flight of 150 hours, 40 minutes and 15 seconds was completed at the Los Angeles Metropolitan Airport by the Army plane, *Question Mark*. The personnel of the flight was: Major Spatz, flight commander; Sgt. Roy Hooe, chief mechanic; Lieut. Thomas, Lieut. Elwood Quesada, Lieut. Harry A. Halverson, and Capt. Ira Eaker, chief pilot.

**10th**—Sir George Hubert Wilkins completed an aerial exploration of Graham Land, Antarctica and vicinity. He was accompanied by Carl B. Eielson and flew a Lockheed Vega, powered with a 225-horsepower Wright Whirlwind engine.

## FEBRUARY

**5th**—Capt. Frank Hawks landed at Roosevelt Field, L. I., on a flight from the Los Angeles Metropolitan Airport in which he established a new transcontinental non-stop record of 18 hours and 22 minutes. Capt. Hawks piloted a Wasp-powered Lockheed Air Express.

**6th-13th**—The New York Aviation Show was held at Grand Central Palace, under the auspices of Aviators' Post No. 743 American Legion.

**11th**—Miss Bobbie Trout set a new endurance flight record for women of 17 hours and 5 minutes when she landed at Mines Field, Los Angeles. Miss Trout flew a LeBlond-powered Golden Eagle biplane.

**23rd**—Capt. George Haldeman, in a standard Bellanca CH monoplane, made the first non-stop flight from Canada to Cuba. He took off from Walkersville, Canada, and arrived at Havana 12 hours and 56 minutes later, having traveled a distance of 1,404 miles.

**27th**—The former Secretary of War, Hon. Dwight F. Davis, formally presented the D. F. C., awarded by Act of Congress, approved December 18, 1928, to Orville Wright, and posthumously to his brother, Wilbur Wright.

**28th**—A Fokker Universal piloted by J. Lloyd O'Donnell took off from the field at Reedly, Calif., towing a glider piloted by Dale L. Drake. En route to Long Beach, Calif., an over-night stop was made at the Los Angeles Metropolitan Airport.

## MARCH

**17th**—Mrs. Louise McPhetridge Thaden set a new world's record endurance flight for women when she landed at the Oakland, Cal., airport after flying for 22 hours and 3 minutes in a Travel Air biplane.

**26th**—(Brazil). Captains Ignacio Jimenez and Francisco Iglesias, Spanish pilots, landed at Bahia, Brazil, completing a 4,000-mile non-stop flight from Seville, Spain, in 43 hours. They flew in the *Jesus del Gran Poder*, a Breguet biplane powered with a 600-horsepower Hispano Suiza engine. Their flight was the sixth successful aerial crossing of the South Atlantic.

## APRIL

**6th-14th**—The Second Annual All-American Aircraft Show was held in Convention Hall, Detroit, Michigan.

**17th**—(Germany). The record for carrying the greatest load in a landplane to an altitude of 2,000 meters (6,617.7 feet) was made by Pilot Steindorf who climbed to that height with 14,220 pounds. He flew a Rohrbach Romar, powered with three BMW 500-horsepower engines.

**23rd-24th**—Miss Elinor Smith set a new solo endurance record for women by remaining in the air over Roosevelt Field for 26 hours and 20 minutes. She flew a Bellanca monoplane powered with a Wright Whirlwind engine.

**26th**—(India). The English Fairey Napier long-range mono-

plane landed at Karachi in an attempted non-stop flight from England to Bangalore. Unfavorable winds and lack of fuel brought the ship down after it had flown 4,130 miles in 50 hours and 48 minutes.

## MAY

**2nd-4th**—The National Elimination Balloon Races were held at the Pittsburgh Stadium, Pittsburgh, Pa., to select the three entries which were to represent the United States in the International Gordon Bennett Trophy Race at St. Louis on September 28. The Navy No. 1 balloon, piloted by Lieut. Thomas G. W. Settle, with Ensign Wilfred Bushnell as aide, won the race, having traveled 900 miles to Prince Edward Island in 42 hours and 18 minutes.

**7th**—(Spain). The International Aeronautic Conference and Exhibition was held at Sevilla, Spain.

**7th**—(Germany). Pilot Stark established a new world's speed record for seaplanes carrying a payload of 1,102.31 pounds by traveling at the rate of 161.511 miles per hour. He flew a Hienkel HD-38 seaplane powered with a BMW 600-horsepower engine. The former record of 147.263 miles per hour was held by Lieut. Stephen Callaway of the United States Navy.

**8th**—Lieut. Apollo Soucek of the United States Navy set a world's altitude record for landplanes of 39,140 feet in a Wright Apache plane at the Anacostia Naval Air Station.

**15th-18th**—The First Annual Airport Convention was held at Cleveland, Ohio.

**15th-31st**—The 1929 Aeronautical Exposition and International Air Races were held at Mexico City, Mexico, under the auspices of the International Federation of Aeronautics.

**15th**—(Germany). A record long-distance sailplane flight was accomplished in Germany by the Austrian, Kronfeld, who flew 90 miles from Berbeshoevede to Detmold in 5 hours and 15 minutes. The glider reached a maximum altitude of 3,000 feet during the flight.

**19th**—Laurie Young established a new world's endurance record flight for light planes when he remained in the air 25 hours and 5 minutes at Jacksonville Beach, Florida. He flew an OX-5 Curtiss Robin equipped with special gas and oil tanks.

**25th-June 1st**—The First Annual St. Louis Aircraft Show was held in the New Coliseum, St. Louis, Mo.

**25th**—Existing speed records for standard military planes were shattered when Lieut. W. C. Tomlinson flew a Wasp-powered Curtiss Hawk over a 100-mile course at the Anacostia Naval Air Station and won the Curtiss Marine Trophy Race at an average speed of 175.01 miles per hour.

**26th**—R. L. Robbins and James Kelly landed at Fort Worth, Texas, after setting the world's record for refueling in flight of 172 hours, 32 minutes and one second. They flew in the *Fort Worth*, a Ryan monoplane powered with a Wright J-5 Whirlwind engine.

**26th**—(Germany). Flying a Junkers W-35 monoplane, Willy Neunhofer set a new world's altitude record without useful load when he ascended 42,123 feet over the Junkers flying field at Dessau. He broke the former record established by Lieut. Soucek, who reached 39,140 feet on May 8th.

**28th**—Two new American altitude records for light planes were established at Parks Airport, St. Louis, by Barney Zimmerley who took a Barling NB-3 aloft to an altitude of 25,100 feet. His plane, powered with a Fairchild Genet engine of 80 horsepower, weighed 680 pounds. Zimmerley established the record for planes weighing 771 pounds and under and for planes weighing 881 pounds and under.

**29th**—Miss Marvel Crosson set a new unofficial altitude record for women when she reached an altitude of 24,000 feet over Los Angeles. She flew a Ryan Brougham powered with a Wright Whirlwind engine.

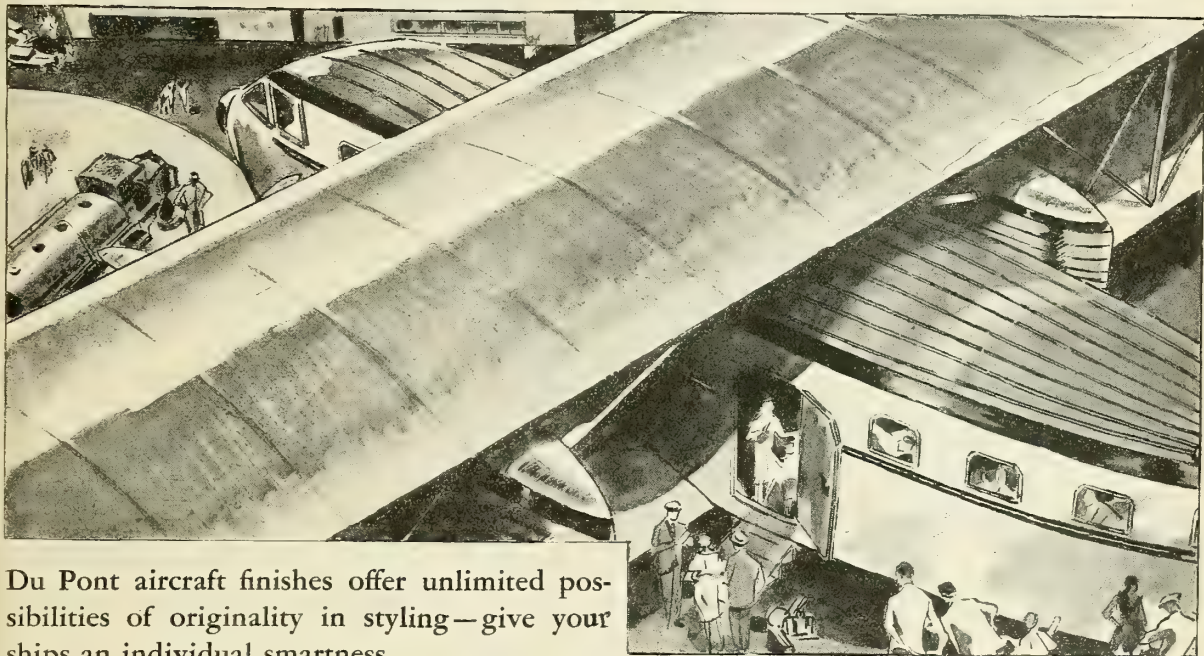
**29th**—Herbert J. Fahy broke the official record for solo flight when he remained in the air over Los Angeles for 36 hours, 56 minutes and 36 seconds. He flew a Lockheed Whirlwind Vega.

## JUNE

**4th**—Lieut. Apollo Soucek, U. S. N., set a new world's altitude record for seaplanes when he ascended to a height of 38,560 feet

(Continued on next page)

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WITH the modern high development of mechanical design in aircraft—greater emphasis must now be placed on color, beauty, *styling*. In ships for private owners, beauty and convenience attain the same importance that they hold in motor car design. Commercial passenger planes demand the same comforts and luxury of fittings that are found in buses, yachts and Pullman cars.

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at the Anacostia Naval Air Station. He flew the Wasp-powered Wright Apache, equipped with pontoons, in which he established an altitude record for landplanes on May 8th.

**11th—(Germany).** Rolfe Stocke established a speed record for seaplanes carrying a useful load of 1,000 kgs. (2,200 pounds) over a distance of 1,000 kms. (625 miles) when he maintained an average speed of 138.116 miles per hour during his flight which lasted 4 hours, 29 minutes and 50 seconds.

**13th—**The transatlantic airplane, *Yellow Bird*, took off from Old Orchard, Maine, for Le Bourget Field, Paris. The ship was a Bernard monoplane, powered with a 12-cylinder Hispano-Suiza engine. It was flown by three French fliers, Jean Assolant, Rene Lefevre and Armeno Lotti, Jr.

**14th—**The *Yellow Bird* landed near Comillas, Spain, with its fuel supply exhausted, after having traveled a distance of 3,128 miles from Old Orchard, Maine.

**20th-22nd—**The 1929 National Model Airplane Meet was held at Detroit under the auspices of the Airplane Model League of America. There were 129 entries.

**21st—(Spain).** A Dornier-Wal flying boat, the *Numancia*, carrying four Spanish fliers, Comdr. Ruis de Ala, Major Ramon Franco, Capt. Gallarz and Mechanic de Madariaga, took off from Alcazares on an attempted transatlantic flight.

**29th—**Following a week adrift in the Atlantic, the *Numancia*, was found and the four Spanish fliers were rescued by the British aircraft carrier *Eagle* near Santa Maria, near the Azores group, where they had been forced down out of fuel on June 22nd while trying to make Fayal.

**29th—**Mrs. Phoebe Omlie set an unofficial altitude record for women when she ascended to a height of 25,400 feet in a flight over Moline, Ill., in a Monocoupe monoplane.

**29th—**Capt. Frank Hawks landed at Roosevelt Field, L. I., 44 hours, 3 minutes and 2 seconds after taking off from the same field, flying to Los Angeles and return. The flight from Roosevelt Field to Los Angeles required 19 hours, 10 minutes and 32 seconds, setting a new East-West transcontinental record. The return trip was made in 17 hours, 38 minutes and 16 seconds, setting a new West-East record. The actual flying time for the round trip was 36 hours, 49 minutes and 48 seconds. Capt. Hawks flew a Lockheed Air Express powered with a Pratt and Whitney Wasp engine.

## JULY

**7th—**Byron K. Newcomb and Ray L. Mitchell established a new world's refueling endurance flight record of 174 hours and 59 seconds over Cleveland, Ohio. They flew a Wright Whirlwind powered Stinson-Detroiter.

**7th—**A world's long distance record for light planes was established by Dwight B. Zimmerley in a 1,725-mile flight from Brownsville, Texas, to Winnipeg, Canada, in a total elapsed time of 16 hours. Zimmerley flew a LeBlond Barling NB-3 low-wing monoplane weighing less than 771 pounds. He carried a load of 871 pounds.

**8th-9th-10th—**The Western States Air Commerce and Airways Conference was held at Boise, Idaho, to perfect a permanent organization of Western states for the purpose of establishing uniformity in the development of regulatory measures affecting the aeronautical industry.

**8th—**Roger Q. Williams and Lewis A. Yancey took off at Old Orchard, Maine, on a non-stop flight to Rome, flying the Bellanca monoplane *Pathfinder*.

**9th—(Spain).** The transatlantic plane *Pathfinder* was forced down by lack of fuel at Santander, having covered a distance of 3,439 miles in 31 hours and 30 minutes.

**9th—**A refueling endurance record was established at Culver City, Calif., by L. W. Mendell and R. S. Reinhart who kept their Buhl cabin sesquiplane in the air for 246 hours and 44 minutes. The plane was powered with a Wright Whirlwind of 220 horsepower.

**10th—(Spain).** The *Pathfinder* flew from Santander to Rome.

**10th—(England).** The trimotored Fokker, *Southern Cross*, arrived at Croyden Aerodrome ending a flight from Sydney, Australia, which was accomplished in 13 days. The plane was piloted by Capt. Charles Kingsford-Smith, with H. A. Lichfield as navigator, MacWilliams as mechanic and C. T. P. Ulm as passenger.

**13th—**The *St. Louis Robin* took off at St. Louis, Mo., on a

refueling flight over St. Louis. The plane was piloted by Dale (Red) Jackson and Forest O'Brien.

**13th—(England).** The Royal Air Force Display was held at Hendon.

**16th-27th—(England).** The Seventh International Aero Exhibition was held at the Olympia, London.

**29th—(France).** Mlle. Maryse Bastie broke the woman's solo endurance record in a flight of 26 hours and 46 minutes over Le Bourget Field, Paris. Mlle. Bastie flew a Caudron monoplane powered with a 40-horsepower engine.

**30th—**After 420 hours and 21 minutes in the air, the *St. Louis Robin* landed under its own power and completed a world's record endurance refueling flight made over St. Louis. The plane was in the air for 17½ days and exceeded the former endurance refueling record by 173 hours, 37 minutes and 28 seconds.

## AUGUST

**1st—(Germany).** The *Graf Zeppelin* left Friedrichshafen for Lakehurst, N. J., carrying 19 passengers and a crew of 42.

**3rd—(France).** The *Challenge International de Tourisme* (International Contest for Light Planes) was held at Orley Field, near Paris.

**4th—**The *Graf Zeppelin* arrived at the Naval Air Station, Lakehurst, N. J., after a flight of approximately 5,000 miles from Friedrichshafen made in 93 hours and 23 minutes.

**6th—**The Second Bombardment Group of the Army Air Corps completed a flight from Langley Field, Va., to Rockwell Field, Calif., in a total elapsed time of 41 hours, and actual flying time of 30 hours. The flight was made in nine Keystone LB-7 twin-engined bombardment airplanes.

**8th—**The Lakehurst-to-Lakehurst 'round the world flight of the *Graf Zeppelin* started at the Naval Air Station, Lakehurst, N. J., via Friedrichshafen, Tokio, and Los Angeles.

**24th-Sept. 2nd—**The National Air Races and Aeronautical Exposition was held at Cleveland, Ohio.

**27th—**The Lakehurst-to-Lakehurst 'round the world flight of the *Graf Zeppelin* was completed. A total distance of 19,000 miles by way of Friedrichshafen, Tokio and Los Angeles was flown in 21 days, 7 hours and 34 minutes. The actual flying time was 11 days and 33 minutes.

## SEPTEMBER

**1st—**The *Graf Zeppelin* left Lakehurst for Friedrichshafen carrying 17 passengers and under the command of Ernst A. Lehmann, assistant director of the Zeppelin Works.

**4th—(Germany).** The *Graf Zeppelin* arrived at Friedrichshafen on its flight from Lakehurst accomplished in 66 hours, which made the Germany-to-Germany 'round the world flight one day less than the Lakehurst-to-Lakehurst flight, or 20 days and 4 hours.

**6th-7th—(England).** The Schneider Trophy Race was held at the Isle of Wight. Flying Officer H. R. D. Waghorn placed first with an average speed of 328.63 miles per hour. He flew a Supermarine S-6, an all-metal, low-wing monoplane, powered with a Rolls-Royce Type R engine. Dal Molin of Italy, the only other country competing, captured second place with an average speed of 282.11 miles per hour, flying a Macchi monoplane.

**7th-15th—**The Aircraft Exhibit of 1929 was held in the Coliseum at Chicago.

**10th-20th—(France).** The Aero Club of France Meeting was held at La Baule.

**17th—**The ZMC-2, first successful all-metal dirigible, was accepted by the Navy.

**19th—**Goesta Andree of the Swedish army left Stockholm on a flight to Capetown, South Africa.

**24th—**Lieut. James H. Doolittle made a successful blind solo flight at Mitchel Field, L. I., under the auspices of the full-flight laboratory of the Daniel Guggenheim Fund for the Promotion of Aeronautics which was formed to study the problem of fog-flying. Lieut. Doolittle took off, flew away from the field for several miles, turned and came in for a landing a short distance from his starting point, flying entirely by instruments.

**26th—(France).** Capt. Dieudonne Coste and Maurice Bellonte took off at Le Bourget Field on a non-stop flight to Tokio in their plane, *Interrogation Point*, carrying fuel sufficient for 50 hours of flying.

(Continued on next page)

# KEYSTONE-LOENING AMPHIBIAN "AIR YACHT"



Keystone-Loening Air Yacht, of the Western Air Express, at Catalina Island, Avalon Bay, California

## TO CATALINA *via* WESTERN AIR EXPRESS

The "Magic Isle" of Catalina, California's popular pleasure resort, is more popular than ever, now that Keystone-Loening Air Yachts fly there from Los Angeles in the service of Western Air Express. Regular as clock work, these comfortable cabin amphibians maintain schedule on this, the oldest airway passage in the United States. Passengers are whisked over the fifty mile route from Los Angeles Airport to Avalon Harbor in thirty minutes, saving an all-day round trip by way of train and boat.

In the height of the season, as many as seven round trips are made daily, each Air Yacht carrying over five hundred passengers per month. An impressive total of tens of thousands of miles flown, thousands of passengers carried, hundreds of hours in the air for each ship, has been recorded by these dependable amphibians this year, one Air Yacht alone having totaled over 48,000 miles in flight in a six month period. A major transport job has been accomplished at a maintenance cost lower, reports Mr. C. C. Cole, General Superintendent in charge of operations for Western Air Express, "than any other type of amphibian we have operated".

So again do Keystone-Loening Air Yachts prove their worth in daily passenger service. Through their use, an ever-increasing number of representative lines are achieving notable successes in efficient, profitable transportation. We will be glad to confer with interested transport executives regarding the suitability of the Air Yacht for their specific requirements.

6 to 8 passengers : 525 H. P. : 100 M. P. H. Cruising : \$27,900



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(Continued from preceding page)

**28th**—The Gordon Bennett Balloon Trophy Race started at St. Louis. First place was won by Ward T. Van Orman who flew the balloon *Goodyear VIII* a distance of 341 miles.

**29th**—(Manchuria). A new unofficial long distance record of 4,875 miles was established by the French fliers, Capt. Coste and M. Bellonte who were forced down for lack of fuel near Tsitsihar, Manchuria, on an attempted non-stop flight from Le Bourget Field to Tokio in their plane, the *Interrogation Point*.

**30th**—(Germany). The first flight of a plane propelled by rockets was made by Fritz Von Opel at Frankfort in a small machine designed by himself and Friedrich Sanders. He flew a distance of  $1\frac{1}{4}$  miles in 75 seconds and ascended to a maximum altitude of 50 feet.

#### OCTOBER

**2nd-3rd**—A non-refueling world's solo endurance record of 38 hours and 48 seconds was established at the Long Beach Municipal Airport by Vern Speich in a Zenith monoplane powered with a Wright 225-horsepower engine.

**5th**—The 1929 National Air Tour for the Edsel B. Ford Trophy started at Detroit with 29 planes entered.

**14th**—(England). The first trial flight of the British airship R-101, the largest rigid dirigible built thus far, was made from Cardington, England. A distance of between 200 and 300 miles was covered in the air during the test.

**17th**—(France). The French fliers Bourgeois, Goulette and Marchesseau left Le Bourget Field, Paris, in a Farman F. 140 monoplane for a flight in easy stages to Madagascar and Reunion via Oran, Colomb-Bechar, Gao, Elizabethville, Broken Hill, Mozambique and Antananarivo. They carried 300 pounds of mail.

**20th**—(Germany). A new glider record of 14 hours and 44 minutes was set by Lieut. Dinor on a flight near Konigsburg.

**21st**—(Germany). The Dornier Do. X giant flying boat, flew 110 miles carrying 169 persons, taking off and landing at Lake Constance near Friedrichshafen.

**21st**—The 1929 National Air Tour for the Edsel B. Ford Reliability Trophy ended at Detroit with 24 of the 29 planes that entered completing the tour. Twenty-one states were traversed, 32 cities were passed through and two provinces in Canada were visited. John Livingston won first place with a Waco biplane powered with a Wright J-5 225-horsepower engine.

**30th**—(South Africa). The Swedish army flier, Goesta Andree, arrived at Capetown on a flight from Stockholm. He stopped en route at Copenhagen, Berlin, Cairo, Khartum, Victoria Nyanza and Livingstone.

**31st**—Closing date for entries in the Safe Aircraft Competition of the Daniel Guggenheim Fund for the Promotion of Aeronautics.

#### NOVEMBER

**1st**—The four Soviet fliers brought their twin-motored, all-metal monoplane, *Land of the Soviets*, to earth at Curtiss Airport, Valley Stream, L. I., and concluded their 12,500-mile aerial journey from Moscow to New York by way of Siberia, Alaska, the Western United States and Chicago. The fliers, Semyon Shestakov, Philip E. Bolotov, B. V. Sterlingov and D. V. Fufaev, left Moscow on August 23.

**3rd**—Baron Friedrich Warthausen arrived in his Klemm-Damlier monoplane from Albany, N. Y., completing, (except for the Pacific Ocean and two short hops in Asia) an 18,000-mile West-East flight from Berlin.

**9th-16th**—The Western Aircraft Show was held at Los Angeles, Calif. under the auspices of the California Aircraft Exposition Association.

#### DECEMBER

**17th**—Twenty-sixth anniversary of the Wright brothers' flight of the first man-carrying heavier-than-air machine.

**31st**—Daniel Guggenheim Fund for the Promotion of Aeronautics closes its activities.

## EFFICIENCY, THE KEYNOTE TO PROGRESS

(Continued from page 298 of the November issue of *Aero Digest*)

By Leon Kelley

IN the annual competition for the Detroit News Trophy beginning 1922, four years of racing were required to free the event from the domination of Government craft and open it to commercial builders. In the four contests since 1925, the interest in speed has clearly and no less steadily given place to a rising interest in efficiency. With the Aviation Club Trophy, only the first competition was won by service craft. Seven years of racing for this celebrated prize should have provided a definite stimulus to the development of commercial airplane efficiency, but the most we may conclude is that this event also has awakened some public and aeronautic interest in competitive efficiency, without greatly affecting the promotion of fundamental design.

Yet if some commentators have considered speed the paramount issue of these trophy races, the results must be admitted disappointing. The highest average speed registered in the News Trophy event was 140.30 m. p. h., by a Lockheed in 1928; and in the Club Trophy, 138.39 m. p. h., by a Pitcairn in 1927. These figures are considerably lower than the Department of Commerce stock model high-speed performance rated to two or three of the very planes which have been entered in these events during the past two years. Only once was speed and efficiency won by the same plane. Compare these speeds with the speed of a specially-developed commercial builder's product, the Travel Air stub-wing monoplane, which flew 194.90 m. p. h. in the Cleveland free-for-all, if it's speed that's wanted! Again, in the trophy contests, no marked consistency of outstanding speed performance has been shown by any one builder or

type, only one plane having won first place for speed in either event for more than one year, namely, the Pitcairn in the 1926 and

1927 Club Trophy races; although Curtiss planes have twice won second place, and first place once.

Quite another story comes out of the efficiency sections of these contests. In the four years of commercial participation in the News Trophy, it will be noticed that one

C. M. Bellanca, has carried off first place three times; and in seven annual contests for the Club Trophy the same builder has taken five firsts! This would largely confirm the purpose often expressed by Bellanca that he has conscientiously striven to develop American airplane efficiency.

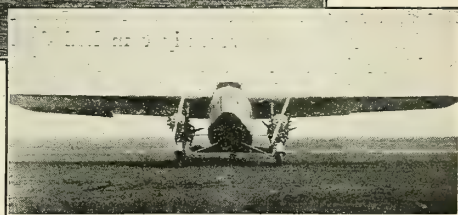
The records incidentally show that Bellanca's planes have placed two first and one second in the speed section of the News Trophy, and one first and one second in the speed section of the Club Trophy, though the highest average speed accredited to Bellanca in these events was that made in the 1926 News race by Lieut. Champion at 121.531 m. p. h. It is commonly known through the industry that Bellanca always instructs his racing pilots to fly on reduced throttle in races based on fuel consumption, which may be taken as evidence that he has the strength of his convictions.

Perhaps the most surprising thing about this consistent performance, however, is the admitted fact that the Bellanca design entered in all of these contests has stood fundamentally unchanged ever since the first cabin job was entered by this designer in 1923. The type was first built in 1922. According to Bellanca, the plane is today essentially what it was eight years ago, though of course it has undergone many improvements at his hand, and the refinement

(Continued on page 270)

The plywood wings of the F32 were finished  
with Murphy Aircraft Flexible Lacquer . . .

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# AERODYNAMIC SAFETY FACTORS

THE progress of commercial aviation depends, to a great extent, upon securing and

By Dr. Michael Watter

handling of planes, but also in the technical and operating features.

proving the safety of air transportation. Safety is not the only major requirement which must be met by the airplane, however, since speed, comfort, and low cost of operation are also important for successful competition with other existing means of travel. Nevertheless, the question of aerodynamic safety is the paramount problem confronting the airplane designer.

Aeronautical engineers and scientists realize, however, that the problem of air transportation is not yet fully solved, that there are a great many difficult points still to be considered, and that, just as in the case of steamship and rail travel, the solution of the problem of safety in air transport does not reside wholly in the perfection of mobile equipment (i.e., the airplane), but depends as well on the development of efficient ground organization, radio and weather service, adequate terminal facilities, etc.

The Navy Department recently compiled data on aviation accidents in the Naval Air Service during the last eight years. The specialized requirements of Naval Aviation make it impossible to deduce from such a study any general conclusions applicable to all flying, but a comprehensive survey of the causes of accidents parallel with the record of commercial aviation make more intelligible the problems of safety which confront all aeronautic engineers and scientists. The detailed causes of accidents which are given in the Navy report are as follows:

Errors of pilot .....	52 per cent
Power plant failures .....	18 per cent
Structural failures .....	13 per cent
Condition of airport .....	9 per cent
Weather .....	2 per cent
Supervising personnel .....	2 per cent
Miscellaneous .....	4 per cent

The records of commercial aviation indicate that errors of piloting explain 50 to 55 per cent of accidents, whereas the dangers resulting from engine failure and atmospheric conditions cause about 40 per cent of the total number of accidents.

Considering the present status of aeronautical science, methods of building airplanes, enforcement of air regulations and Government licensing of aircraft and engines, one may safely state that the problem of mechanical safety is approaching solution. The dangers of structural failures and fire in the air are now almost negligible. With more highly perfected engines and better power plant installations assured by the licensing of planes, we are certain of rapid improvement in that respect, while weather forecasts and generally better meteorological service will decrease considerably accidents resulting from atmospheric conditions. A great many accidents which are classified as due to the latter two groups, however, are undoubtedly partly also the result of certain deficiencies of the airplane or of the lack of proper ground facilities.

Nevertheless, any record of accidents strongly indicates the necessity for aerodynamic perfection of airplanes. Given proper ground facilities, intelligent meteorological information, emergency landing fields and reliable power plants, the success of air transportation would depend solely upon the aerodynamic safety of airplanes, as such.

Because of its three dimensional nature, flying requires a well-trained personnel, trained not only in the actual

knowledge of facts necessary for mechanical perfection of the airplane and the requirements of safety from the operating viewpoint, the problems confronting airplane designers and aeronautical scientists are related mainly to aerodynamic safety. The pilot of a heavier-than-air machine (either landplane, seaplane, amphibian, or flying boat, but referred to hereafter simply as aircraft) must be able to take off, fly and land, retaining full control of his ship at all the stages of its operation.

## Airplane Control

An airplane is considered to be balanced if the efforts required from the pilot to maintain its attitude in flight are slight. A craft is called stable if, once deviated from its original course by any outside cause, it has a tendency to return to its original position. Although a plane may tend to return to its original attitude, it may start oscillating with increasing amplitude, in which case the plane is considered stable statically but unstable dynamically. A plane which is unstable statically or dynamically may nevertheless fly successfully if it is so balanced that the pilot can exert sufficient force to counteract, by means of control surfaces, the dangerous off-setting moments.

This introduces the problem of controllability of the aircraft, which of course is closely allied to balance, stability and maneuverability. In order that controllability and maneuverability may be better understood, I shall define them in terms simpler than and somewhat different from the accepted scientific definition. I suggest measuring the degree of controllability by the force required to execute a maneuver, and the degree of maneuverability by the time required to complete a maneuver.

The degree of stability, controllability, and maneuverability are largely determined by the purpose of the aircraft and generally are not the same on military and commercial airplanes. But whatever may be the degree of these factors in a particular ship, the pilot must be able to control his machine at any moment and in any attitude,—the word "control" meaning the ability to retain any desired attitude or to correct any undesirable attitude caused by some outside disturbance or willful maneuver.

The definition of stability as tendency to return to the original attitude and condition of flight after any disturbance, suggests that a large degree of stability would be detrimental to controllability and maneuverability. In modern design, however, this has been greatly overcome by proper balance and proper design of control surfaces. The location, plan form and section of control surfaces are not arrived at by artistic fancy or superficial comparison, but through studies and wind tunnel experimentations. The importance of large aspect ratios of tail surfaces has been thoroughly recognized and profiles have been developed which give an efficient slope of the lift curve. Vertical tail surfaces are also being improved, the efficiency of the rudder control having been given considerable attention. At present, particular attention is being paid to the blanketing effect of the body, as well as effects of downwash and slipstream, on the efficiency of tail surfaces.

Inefficient ailerons have been supplanted by narrow ailerons, and wing tips have been designed to overcome aileron flutter and high aileron loads. Improvement in balance and efficiency of con-

(Continued on page 246)

# SOUTHERN AIR TRANSPORT

*A General Picture of Southern Air Transport's Organization and Its Rapid Development*

FROM two small rooms at the Fort Worth Municipal Airport, executives directed the operation of the two mail lines of the Texas Air Transport, Inc., the nucleus of S.A.T.'s present far-flung system. And from a shop below, the two regular mail planes and two OX-5-powered relief ships were daily serviced. Two or three expert mechanics, four pilots, including the general manager who also served as chief pilot, and a few students whom the mail pilots instructed if they were not too weary when they got in from their run—that was the beginning in February, 1928, of the Southern Air Transport, now the largest operating company in the South and second largest in the Aviation Corporation, of which it is a part.

But genuine service, enthusiasm, and hard work are potent factors. And if these were well begun by the original company, they were doubled when A. P. Barrett, well known financier and organizer, now president of the Southern Air Transport and vice president of the Aviation Corporation, purchased the company in November of that year. Expansion was sure and rapid.

First of all, the situation of those few students eager enough to learn aviation to take scraps of time, and of the pilots anxious enough to help to give of their rest-hours, was remedied. The T.A.T. Flying Schools, Inc., was organized, and the first school established at Fort Worth, to be rapidly followed by schools at Dallas, San Antonio, Houston, New Orleans, Atlanta, and finally Amarillo. Now there are nearly 200 pupils enrolled at these seven schools.

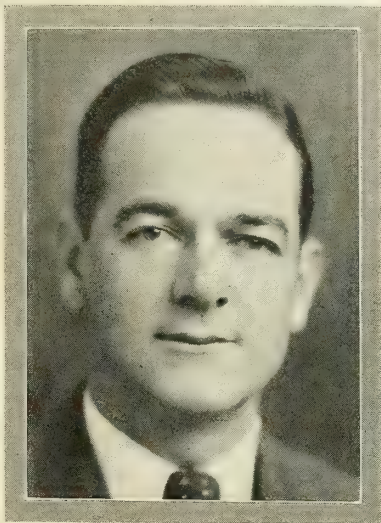
Then the Texas Aeromotive Service, re-christened with its expansion to cover the South as Southern Aeromotive Service, was organized. Its function originally was to service the planes of the Texas Air Transport, Inc., and to that end service stations were established at strategic points along the lines. But the need for service available to other operators and private airplane owners was so urgent that the company early branched out to fill this need in Southern aviation. Now it operates from El Paso to Atlanta, maintaining sales and service at sixteen major ports in the South.

A little later the Southwest Insurance Agency was organized to handle the insurance of airplanes and to engage in the insurance business generally, and the S. A. T. Broadcast Company to operate KSAT, a radio station to put the company "In the air, on the air, everywhere."

And then the passenger lines were established, operated by the T.A.T. Flying Service, Inc., since changed to S.A.T. Flying Service. The first line extended from Brownsville through Corpus Christi to San Antonio. It has since been extended from San Antonio to Fort Worth via Austin and Waco; a line from Fort Worth and Dallas to Houston has been established, and one from Dallas and Fort Worth to El Paso.

By C. R. Smith

*General Manager  
Southern Air Transport, Inc.*



C. R. Smith

About this time Mr. Barrett also brought about the merger of the Gulf Coast Airways system, operating air mail lines from Houston through Beaumont, New Orleans, Mobile and Birmingham to Atlanta, and organized Southern Air Transport, Inc., as a holding company not only for his various aviation interests but also for the Southwest Insurance Agency, the S.A.T. Broadcast Company and the Dixie Motor Coach Corporation, which he had organized following his purchase in July, 1928, of three bus lines at Dallas and which now operates over 1,177 miles in Texas, Oklahoma and Arkansas.

The aeronautical needs of the South were not yet satisfied. Airports were a crying need to the advancement of aviation, and so the company to build them was created, first as a division of the Southern Air Transport, Inc., and then a separate company known as the Airports Engineering and Construction Corp. This company is prepared to select the sites for, drain and grade airports, design and build runways and buildings, furnish the

materials, and equip the port in every way even to the floodlights topping the hangar.

The sales division was created to coördinate the sales activities of the Southern Aeromotive Service, the Airports Engineering and Construction Corp., and other general sales. It handles everything aeronautical from "thimbles" to a complete line of airplanes ranging in price from \$3,500 to \$105,000.

Air Express is one of the latest additions to the service of the S.A.T. Carried on all the mail and passenger lines of S.A.T., it is flown 5,862 miles every day. Pick-up and delivery service is maintained at all the main division points in the S.A.T. system.

The company now operates more than 80 airplanes as against the five or six with which it began operation a few short months before. There is a large warehouse at Fort Worth, and office space in use in all the principal cities through which the company operates.

Even this space is not sufficient, and it is planned to erect a 14-story skyscraper in Fort Worth, to be known as the Aviation Building. When this building is completed, the studios of KSAT will be on its top floor.

In the midst of its expansion, a controlling interest in the Southern Air Transport, Inc., was purchased by the Aviation Corporation, and the company is now a part of this vast system operating daily 18,139 miles. All this development in a few months less than a year.

The development of the Southern Air Transport system is indicative of the success which may be attained, even in these pioneering days of commercial aviation operations, by an organization managed according to modern business methods. Southern Air Transport's present status may be taken as a criterion of the broad field commercial aviation has to offer in the way of modern industrial enterprise.





**E. C. Bowe** learned to fly at Shreveport and for a number of years operated his own school there. Later he went to Mexico where he was connected with a commercial company. He is now flying passengers for Southern Air Transport.

**Walter B. McAlister** resigned as field superintendent for a large oil company to take up flying. He has been flying steadily since 1924, conducting flying schools, selling planes and operating his own company at Dallas.

**C. W. (Dub) Childress** enlisted in the Air Service at the opening of the war and was sent to Kelly Field, San Antonio, where he made his first solo in 1918. All during the war he was stationed there instructing cadets. Childress left the Army in 1919, but went back in 1925. He was in the Army intermittently until 1929 when he joined Southern Air Transport.

**Andy Burke**, chief pilot of the Fort Worth division of the T.A.T. Flying Schools, Inc., is a flier of long experience, having first learned to fly during the war. He has spent five and one-half years in

## PILOTS OF THE S. A. T.

commercial aviation. For two years he instructed in aerodynamics at Berkley. He then barnstormed for a couple of years and worked one year with the Humble Oil Company, developing an aviation gas and oil. He came to S.A.T. from Wichita Falls, where he was manager of the municipal airport and general manager of the Lone Star Aviation Co.

**Stanil Gilley**, reserve pilot for S.A.T., is an Army-trained man. After leaving the Army he barnstormed over Iowa and Nebraska. He has flown with the Robertson Aircraft Manufacturing Company, with the Curtiss Robertson Airplane Co. as chief test-pilot, and with the Universal Air Lines from St. Louis to Chicago.

**Jerry Marshall**, divisional manager at New Orleans for S.A.T., is a veteran barnstormer and commercial pilot. He received his training at Brooks and Kelly Fields. He was the first pilot to locate at Austin and organized the School of Aeronautics at Texas University, an organization which he operated three years. His work in this connection occasioned extensive aerial demonstration tours, including flying with the university flying circus. For six months after joining the S.A.T., Marshall flew as an air mail pilot, at the end of which time he was made sales manager and director of the S.A.T. Flying School, and later manager of the New Orleans division.

**Robert H. (Hector) Gray** is a war-time pilot who fought with the 74th Squadron of the Royal Air Force. He is a native of New Zealand. He learned to fly in 1916, flying a pusher Curtiss boat with an OX-2 motor. He graduated from the English School of Aeronautics at Upavon, participated in numerous battles in the air and spent six months as a prisoner of war in Germany. Before joining S.A.T. he was engaged in operations around Amarillo. He is now operations manager of the S.A.T.

**Bledsoe (Slim) Payne** has had a unique job of flying during his career as a pilot. His last job before joining the Southern Air Transport, unit of Aviation Corp., was that flying for a millionaire oil man who ran a muskrat farm guarding against illegal trappers. Payne made his first solo flight on February 8, 1918 at Kelly Field.

Since then he has been in business for himself and has flown for several commercial concerns.

**Joe Glass** is one of the most colorful figures in American aviation. Among his experiences are transporting nitroglycerin, flying Mexican payrolls, and flying in Mexico during the De la Huerta revolution. He has served as chief pilot in charge of operations for the Campana Mexicana de Transportacion Aerea, S. A. He flew the first air mail in Mexico, and mapped by air all the major oil fields of Mexico. He is now air mail pilot for Texas Air Transport.

**Charlie Pedley**, mail pilot for S.A.T., is a pilot who won a reputation as a stunt pilot soon after he learned to fly and later as an air mail pilot who rarely failed to "get through." Among his ventures were the first air news route in Texas, joining in quelling a race riot by plane, and piloting the All Texas Special Transcontinental Tour. He is one of the original pilots flying the mail for the Texas Air Transport.







he became an airplane pilot. He learned to fly during the war, did some barnstorming and then took over the management of a company in Oklahoma, operating a taxi service for oil operators. Then he flew for a while as a test pilot before joining the S.A.T.

**Virgil Turnbull** has spent most of the time since he learned to fly operating his own ships. He made his first solo in 1922 at Ardmore, Oklahoma, and was for some time connected with the Sapulpa Aviation Co., Inc. He is now stationed at the New Orleans division of S.A.T.

**W. J. (Bryan) Robbins**, Texas Air Transport pilot, knows flying from the ground up. He used to work as a mechanic before he started flying. Instructed by Reg Robbins, flier of endurance record fame, he made his first solo from Barron Field in 1923. Within the past six months he has flown more than 547 hours carrying mail.

**Sherman Willard**, reserve pilot at Amarillo, has been flying since 1923 when he taught himself to fly on a Jenny. He has flown with a number of commercial organizations, among them the Arkansas Aircraft, the Trunk Airways of Minneapolis, and the Garland Aircraft Corp.

**L. A. Thro**, now divisional manager at Dallas, Texas, for S.A.T., is one of the oldest fliers in the country, having taught himself to fly on the old "pusher" ships in 1913. During the war he was in the Air Service. Thro has done a lot of exhibition flying and once held the world's record for loops. He has flown with the Minnesota Eaglerock Co. and the Universal Air Lines. Recently he was flying on the Mexican Aviation Company's lines.

**L. S. Turner** flew during the war in the Army Air Service and still holds a commission in the Air Corps Reserve with A. P. rating. He has been in aviation ever since the war. He sold planes in Mississippi and Alabama for two or three years and has worked for a number of airplane manufacturers, including the American Eagle Aircraft Co. and the Swallow Mfg. Co. He has also flown with the Curtiss company.

**Jimmie Youngblood**, pilot on the passenger lines of the S.A.T., was a Lieutenant in the 154 Observation Squadron of the National Guard. Since receiving his transport license he has done a variety of flying, ranging from dusting cotton in Louisiana to flying for a young Indian millionaire who had nothing to do but "make whoopee." He was for a time instructor for the Lake Village Airways Corp. in Arkansas and has flown as test pilot for Command-Aire, Incorporated.

**J. H. Burns** learned to fly, partly through instruction from a commercial flier, but largely through his own experiments at the controls of his old Jenny. He conducted an aerial circus in Cuba, flying there from the United States in a ship with an OX-5 motor. Later he went to Cuba again to carry newspapers by air. He barnstormed some more, took a job with a company operating scheduled lines, and last year joined the S.A.T.



**H. B. (Pete) Taylor**, general manager of the Southern Aeromotive Service, is recognized as one of the foremost authorities on airplane maintenance in this country. All his life he has spent in a "mechanical world." He has had twelve years' experience in airplane engineering and maintenance. He is also an experienced pilot, having learned to fly in 1919.

**Ewing Brierly** learned to fly thirteen years ago when flying came high—a dollar a minute—and the pilot with 1,000 minutes to his credit was a veteran flier. He worked for an airplane manufacturing company for a while and then joined the Army. He barnstormed for several years and opened Wallace Field on the banks of the Mississippi. He was also a test pilot for an airplane manufacturing company.

**Phil Lampert**, assistant operations manager of the Southern Air Transport, Inc., is a graduate of the U. S. Naval Academy. Resigning from the Navy, Lampert went into a construction company. Later he joined the Curtiss Flying Service at Garden City, Long Island, where he learned to fly. He was with the National Air Transport as field manager several years.

**L. S. Andrews**, air mail pilot for T.A.T., is another pilot who has won a reputation as one of the most skilled pilots—one who takes his ship out and brings her back day after day through fair weather or foul. He is an Army trained man. He finished training in 1917, did duty as advanced pursuit instructor and on border patrol. He was commandant of 90th Attack Squadron in 1923.

(Continued on page 88)

**A. R. Perkins** has done a generous share of barnstorming. He was with the Charles-Harding air circus for a time, flew with the Montezuma Country Club, and with the Bell-Woods Land Co., a pioneer company in showing prospects the Rio Grande Valley from the air. He is now an air mail pilot.

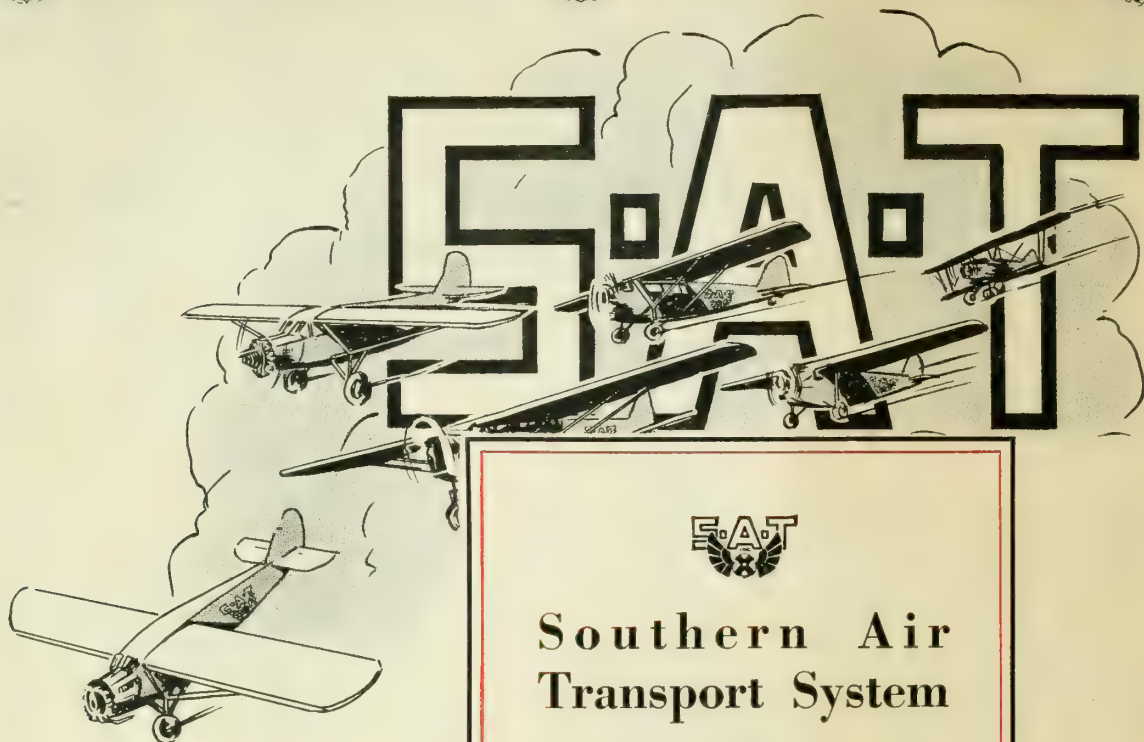
**Homer Rader** is one of Texas Air Transport's first pilots, flying through the rains, and fogs, and storms of that severe winter when the air mail was first inaugurated in Texas. Rader is one of the oldest commercial pilots in Texas. He was trained at Brooks and Kelly Fields. He was a pilot with the University Flying Circus which traveled over the country a few years ago. In 1927 Rader flew the night air mail from Cincinnati to Chicago and has flown the E. R. Express from Louisville to Cleveland. Now flying on the Dallas-El Paso passenger line.

**Howard Woodall**, pilot on the passenger lines of the S.A.T. Flying Service, has had a varied career as a flier. He was for some time associated with Captain Bill Erwin and has flown with the Douglas Co. He has also conducted his own business, operating the Travel Air Ways of Dallas.

**Paul Vance**, manager of the San Antonio division of the Southern Air Transport, Inc., learned to fly before the war, and except for the interim of the war, has been flying ever since. He flew for a time for the San Antonio Drug Co., delivering serum and other drugs. Since 1922 he operated his own school of flying until he joined the S.A.T.

**Garza Wooten**, reserve pilot at Dallas, tried piloting racing automobiles before





**T**he South  
takes to the air  
and builds one  
of the Major  
Airline Oper-  
ators of the  
Nation



## Southern Air Transport System

### *S. A. T. Flying Service, Inc.*

Flying over 3000 miles daily, S. A. T. ships, carrying passengers and express, bring all major Texas Cities within a few hours of each other. S. A. T. Flying Service is also distributor in the south for a number of the best known commercial and sport type planes.

### *Texas Air Transport, Inc.*

From Brownsville on the border to the southwest, to Atlanta on the east, air mail ships of Texas Air Transport and Gulf Coast Airways carry the mail over 3200 miles each day.

### *Southern Aeromotive Service, Inc.*

Responsible for the safety and continuous operation of S. A. T. ships . . . at eleven strategic points offering aero supplies, parts, service.

### *Airports Engineering and Construction Corporation*

Counsel, engineering, planning, designing and actual construction service that is forwarding the tremendous work of adequate airport facilities for the South.

### *KSAT—T. A. T. Broadcast Co., Inc.*

"On the air—in the air—everywhere" . . . under the call letters KSAT, Southern Air Transport System operates a commercial broadcasting station . . . in addition a short-wave system keeps all branches in close contact and reaches out to ships in the air.

### *S. A. T. Flying Schools, Inc.*

The training Division of Southern Air Transport System. Dixie Motor Coaches is another affiliated company.

## Southern Air Transport System

DIVISION OF THE AVIATION CORPORATION

General Offices: FORT WORTH NATIONAL BANK BLDG., FORT WORTH, TEXAS

SOUTHERN AIR TRANSPORT SYSTEM



With a ground service heretofore unequalled in the United States, S. A. S. offers complete aircraft and motor service, parts and supplies at eleven strategic ports of the South.

The very same type of service which is behind the safe and profitable operation of Southern Air Transport ships is available for your own plane, whether it is re-fueling, patching a wing, checking or rebuilding your motor, a new hull, or just a pair of goggles.

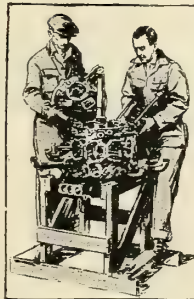
If you're not within gliding distance, an SOS to S. A. S. by wire or telephone will dispatch a plane with necessary tools and equipment in the hands of a government licensed pilot.

There's an S. A. S. port of service at:

AMARILLO  
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### *A Catalog That Will Help You*

The S. A. S. catalog is among the most comprehensive of its type. No ordinary catalog, this, it is of value to any man or organization whose ships touch the South. Write for it today.



Finest precision instruments and tools—factory methods and factory tolerances—in every single operation, with a double check to the merest detail by specialized personnel . . . that is the type of service that awaits you at any S. A. S. port.

Wherever you are in the South—you are within the operations area of a Southern Aeromotive Station.

# Southern Aeromotive Service, Inc.

SOUTHERN AIR TRANSPORT DIVISION OF THE AVIATION CORPORATION

General Offices: FORT WORTH NATIONAL BANK BLDG., FORT WORTH, TEXAS

S O U T H E R N A I R T R A N S P O R T S Y S T E M



## PILOTS OF THE S. A. T.

(Continued from page 85)



A. P. Barrett, President of S. A. T.

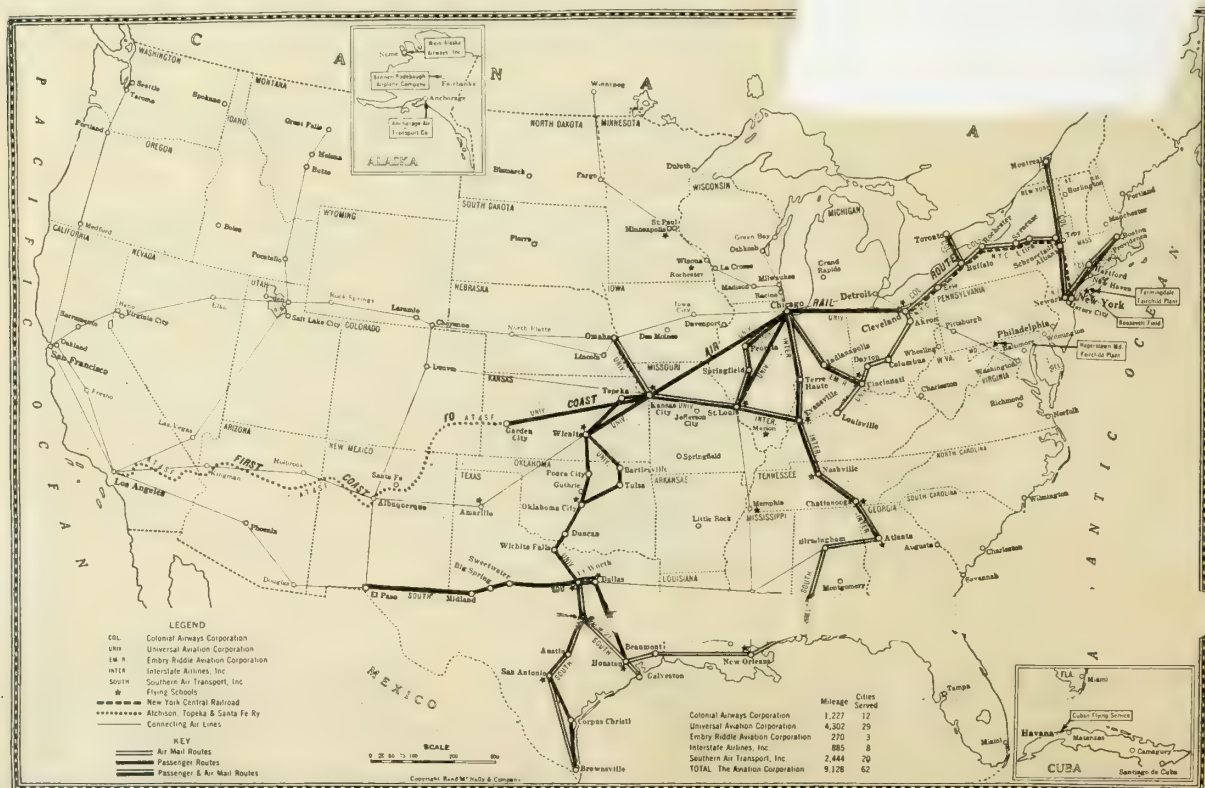
A. P. Barrett, president of the Southern Air Transport, Inc., and vice president of the Aviation Corporation, began his career in the Legislature of Texas, going first to the House and then to the Senate. After he retired from politics he settled in San Antonio to practice law. After "dabbling" a bit in oil, he began a long and successful career building public utility corporations, among them the Texas Louisiana Power Company and the Dixie Motor Coach Corporation, the latter now a subsidiary of the Southern Air Transport, Inc.

Frank Estill, flying school instructor for S.A.T., was for two and a half years an Army flying instructor at Kelly Field, San Antonio. He flew in 1919 with the Victory Loan Flying Circus and served on the border patrol. In 1921 he was mustered out of the Army and out of the flying game until 1923, when he began commercial flying.

W. A. McDonald, instructor in S.A.T. Flying School at New Orleans, has been a prominent figure in Southern aviation for several years. He made his first solo at Beaumont, Texas, in 1924. Since then he has flown steadily, doing all types of flying. Unlike most pilots, he likes instructing and for the past two years has been engaged in that work.

W. K. Ennis, director of aircraft sale for S.A.T., took his training at Brook Field and is now a First Lieutenant in the Reserves. He worked for a while for the Orange Car and Steel Co. as manager of the aviation division. He joined S.A.T. last August.

B. A. Carpenter, who flies the mail for Gulf Coast Airways, Inc., a unit of Southern Air Transport, Inc., was the first aviator to fly under a blimp and hook a plane onto a suspended trellis. Carpenter received his training in the Army, soloing in 1923. After leaving the Army in 1925, he dusted cotton for a while.



Map showing air mail and passenger and express routes of the Aviation Corporation, and their connections with other airlines



FAIRCHILD  
"71" with 11



*Berryloid*  
AIRCRAFT FINISHES

The Fairchild Airplane and Manufacturing Corporation chose Berryloid Aircraft Finishes for superior "quality, appearance and durability." Kreider-Reisner planes are also finished 100 per cent with Berryloid. Nungesser Green and Vesta Yellow beautify the Fairchild and Challenger in the above illustration.



**Berryloid**  
Finishes  
*meet*  
**FAIRCHILD'S**  
exacting  
requirements

**FAIRCHILD**  
was preceded  
in this series  
by  
STINSON  
FOKKER  
BUHL  
TRAVEL AIR  
EAGLEROCK  
KEYSTONE  
BOEING  
and  
COMMAND-AIRE



**FAIRCHILD AIRPLANE MANUFACTURING CORPORATION**  
FARMINGDALE, NEW YORK

July 17, 1929

Berry Brothers,  
211 Leib St.,  
Detroit, Michigan.

Att: Mr. T. B. Colby, Mgr.,  
Aviation Division.

Gentlemen:

Berry Brothers finishes are used on Fairchild airplanes because Berry Brothers finishes meet the exacting Fairchild standards for quality, appearance and durability.

The cooperation of your technical staff and the results of your research and constant striving to produce better finishes are very helpful. May we express our appreciation of your cooperation and valuable work.

Yours very truly,

F. P. Somers, Supervisor,  
Materials and Inspection.

FPS  
IDH

**D I S T R I B U T O R S   O F   B E R R Y L O I D   A I R C R A F T   F I N I S H E S :**

Pacific Airmotive Corp.  
3417 Angeles Mesa Drive, Los Angeles, Calif.

Platt & Tingle  
49 S. W. First St., Miami, Florida

McMullen Aircraft Co.  
Tampa, Florida

Air Associates, Inc.  
Municipal Airport, Chicago, Ill.

Central Wall Paper & Paint Co.  
Indianapolis, Ind.

Aero Supply Co.  
531 W. Douglas St., Wichita, Kan.

Northwest Airways, Inc.  
St. Paul, Minn.

Bredouw-Hilliard Aeromotive Corp.  
604 Broadway, Kansas City, Mo.

Air Associates, Inc.  
Roosevelt Field, Garden City, N. Y.

The Embry-Riddle Co.  
Lunken Airport, Cincinnati, Ohio

Thompson Aeronautical Corp.  
Municipal Airport, Cleveland, Ohio

Johnson Airplane & Supply Co.  
Dayton, Ohio

Ludington Flying Service  
Philadelphia, Pa.

Southern Aeromotive Service, Inc.  
Ft. Worth, Texas

Northern Airways, Inc.  
Wausau, Wisconsin

Aeronautical Corp. of Canada, Ltd.  
Winnipeg, Canada

**M A N U F A C T U R E R S   ,   O F   ,   P R O G R E S S I V E   ,   A I R C R A F T   ,   F I N I S H E S**

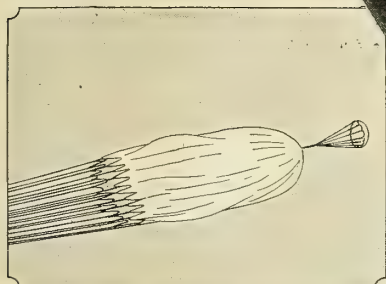


**BERRY BROTHERS**  
Varnishes   Enamels   Lacquers  
Detroit, Michigan   Walkerville, Ont.

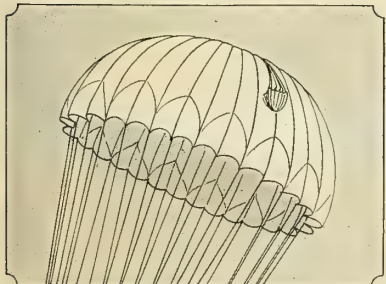


# The PILOT CHUTE

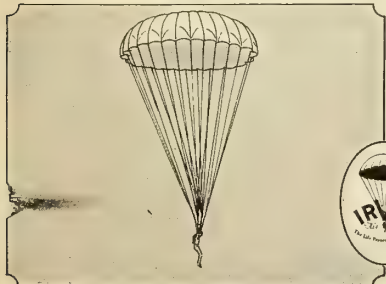
## Assures Happy Landings



As soon as the pack opens, the pilot pulls out the parachute.



Once the parachute fills, the pilot chute has done its work...



And you glide gently to earth for a Happy Landing!

THE pilot chute of an Irvin snaps the parachute out of its pack in record time because this miniature chute is ribbed with spring steel and packed under tension. You jerk the pull ring... it springs out quickly... the big chute fills with air, and you are in flight... gliding gently to earth.

The Irvin Air Chute is available in seat, lap or back pack types. All Irvins are identical in construction and are made in two grades of fine silk, one priced at \$350, the other at \$290. Every one, regardless of price, complies with the standard U. S. Government parachute drawings.

Irvin Air Chutes are available in all sections of the country.

Among the important distributors are Curtiss Flying Service, Inc., The National Flying Schools, Air Associates, Inc., and Nicholas-Beazley Airplane Co.

Dealers who are interested should communicate directly with the company. If there are no dealers near you, write to us and we will arrange the most convenient way to supply your needs.

# IRVIN

*The Life Preserver of the AIR*

IRVING AIR CHUTE CO., INC., 372 PEARL STREET, BUFFALO, N. Y.  
Irving Air Chutes Are Obtainable At All S-A-T Service Depots

Our Motion Picture "Happy Landings" on standard width film, illustrating actual operation of the Irvin Air Chute is available free of charge to schools, clubs and organizations interested in aviation. Send for booklet and particulars.







**C**omplete

**PARTS**

*and Equipment—Service*  
in the South . . .



Four representative scenes from one of the Southern Aeromotive Service warehouses, showing something of the completeness of supplies, parts and equipment stocks carried at every Complete Sales and Service station

*Absolutely  
Complete  
Stocks*



*An extraordinary  
CATALOG  
that should be in  
your files*

*Prepared at great expense, not for idle reading, Southern Aeromotive Service has published a most comprehensive catalog. Write for it today. It will be of real value to you.*

Parts so complete that no re-building or repair job need be held up for want of them—that's the type of service we *must* have to maintain the splendid operations record of the Southern Air Transport System—and it's the type of service that is available to you at any S. A. S. port!

And the men who service you are men who know your needs from experience—men who speak your own language.

Southern Aeromotive Service is a complete sales, supplies and maintenance organization operating at eleven major airports—at Dallas, Fort Worth, Big Spring, El Paso, Amarillo, Waco, San Antonio, Houston and Brownsville in Texas; at New Orleans in Louisiana; at Atlanta in Georgia.

Mark every S. A. S. Sales and Service port on your map—wherever you see the S. A. S. Emblem you can land with the knowledge that whatever you need is waiting for you there.

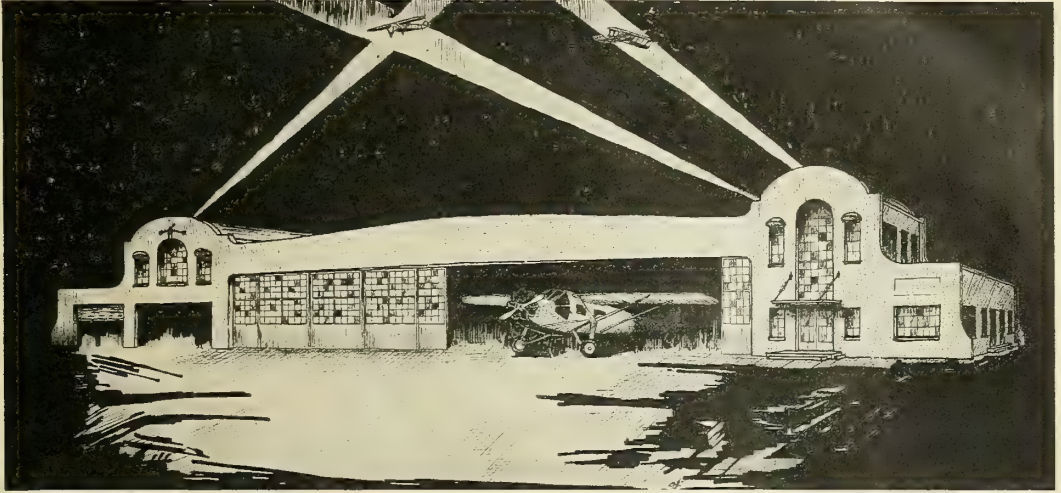
A cross section—just a partial listing of equipment and parts we handle—includes tires in a complete range of casing and tube sizes; motor gaskets, spark plugs, tubing, fire extinguishers, airplane finishes, propellers, gloves, fabric, tools, maps, goggles, helmets, flying suits, piston rings, cable, instruments, starters, chutes, motors, complete ships ready to take off—everything a pilot can possibly need has been provided for in the complete S. A. S. stocks.

**Southern Aeromotive Service, Inc.**

SOUTHERN AIR TRANSPORT DIVISION OF THE AVIATION CORPORATION

General Offices: FORT WORTH NATIONAL BANK BLDG., FORT WORTH, TEXAS

SOUTHERN AIR TRANSPORT SYSTEM



# Practical Experience builds Airports in the South . . .

Eyes to the air, the South  
first builds practical aviation

bases on the ground.

The Airports Engineering & Construction Corporation is the result—organized to serve the South in the selection, design, engineering and construction of airports which anticipate the future, yet consider the finances and practical usages of the present.

Starting as the Airports Division of the Southern Air Transport, the original personnel comprised a carefully chosen group of experienced engineers who could and would build, not on theory, but with the one thought of the practical needs of aviation.

Due to the economy and soundness of the Airports Division's first plans, there quickly developed a widespread demand for its services.

Southern municipalities and private corporations wishing sound, practical airport construction turn to the Airports Engineering & Construction Corporation.



## Airports Engineering & Construction Corporation

SOUTHERN AIR TRANSPORT DIVISION OF THE AVIATION CORPORATION

General Offices: FORT WORTH NATIONAL BANK BLDG., FORT WORTH, TEXAS

SOUTHERN AIR TRANSPORT SYSTEM



# OPERATING PASSENGER LINES OVER AIRWAYS IN TEXAS

NATURE and early Texans gave the Southern Air Transport, Inc., a "flying start" in the operation of air passenger lines when they created a state of such vast level expanses and such distances between cities. Some speedy mode of travel is fundamentally essential.

To meet this need the S.A.T. Flying Service, the subsidiary of the Southern Air Transport unit of the Aviation Corporation that operates the passenger lines, has put into operation a system of lines including Brownsville at the far southern tip of the state and El Paso, the city at the extreme west. Three separate lines are operated: one from Dallas and Fort Worth to El Paso via Breckenridge, Abilene, Sweetwater, Big Spring, and Midland; one from Fort Worth and Dallas to Houston; and one from Dallas and Fort Worth to Brownsville, via Waco, Austin, San Antonio and Corpus Christi. The advantage of air service in Texas is demonstrated by the fact that though the stops are frequent, the average passenger rides more than 260 miles on every trip.

Although the business of operating airlines has been given impetus by natural factors, the business of convincing the public that the airplane is the solution of the problem presented by these distances, that it is safe, that it is economical and advantageous in spite of the apparent added expense is one that has not yet been achieved. Rather, it is a problem that airplane operators must work out by ceaseless planning and experimentation, by patient reiteration, and ingenious effort. This has been the problem of the traffic department of the S.A.T. Flying Service, in addition

By Victor F. Grima

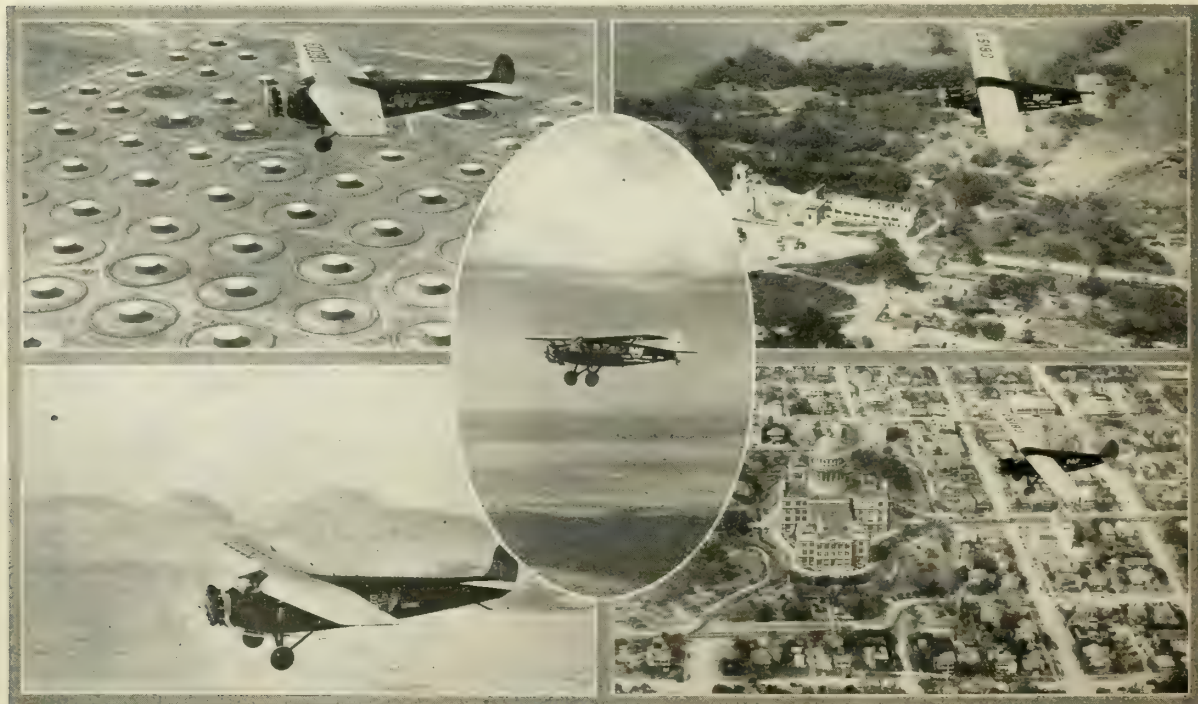
*General Traffic Manager  
Southern Air Transport, Inc.*

tion to the task of evolving a system of mechanics for handling the passenger traffic once people are taught to fly.

The system used by the traffic department of the Southern Air Transport in its fundamentals does not differ radically from that of other companies, but this department has done considerable experimentation in the working out of the details. The organization of the department consists of a general traffic manager, an assistant general traffic manager, divisional traffic agents, divisional managers stationed at the various divisions of the Southern Air Transport system to handle traffic problems in conjunction with their other duties, and part-time ticket agents in hotels and traffic bureaus.

Several groups of business and professional men have already been won over to the practicability of airplanes and now make frequent trips over the lines. Among these are oil operators and executives, bankers, doctors, legislators, lawyers, contractors, and other such individuals whose holdings are scattered over a large territory or who are convinced of the dollars and cents value of their time.

Possibly the most important problem in making flying profitable to these passengers is to arrange schedules so that they can make the most of the time they save in flying. Important train and plane connections must be considered, and the time of arrival with relation to business hours must be given attention. For example, the schedule on Passenger Route 80, operating from Dallas and Fort Worth to El Paso, has recently been changed to offer better service. Formerly departure from both termini was at mid-



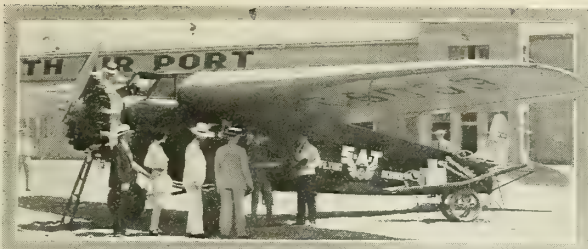
Interesting scenes along the S.A.T. airlines. In the center, typical desert country, West Texas; upper left, a tank "farm" in the oil district; right, an old Spanish mission; lower left, mountainous terrain near the New Mexico border; right, the State Capitol, Austin.

morning with arrival in the late afternoon. Under the new schedule the plane from El Paso leaves at 6:30 a.m. Mountain Time, arriving in Fort Worth and Dallas shortly after noon, giving business men from El Paso and intermediate points ample time to transact business and return to their homes by night trains. It also makes connection with three important train schedules to the north and east, reducing by a day passenger traffic to New York and Chicago and with the plane operated by the Braniff division of the Universal Air Lines, to Tulsa and Oklahoma City, permitting a through trip from the far corner of Texas to the Oklahoma cities the same day. The westbound plane leaving Dallas at noon offers similar advantages in its schedule, giving quick service to Los Angeles and other Pacific Coast cities.

In a long line between two important cities the schedule is arranged to cover the best service possible to the termini. The Dallas to Brownsville line is 547 miles long; yet the schedule has been worked out so that it is advantageous both to Dallas and Brownsville and the intermediate stops. The plane takes off at Dallas at 8:30, early enough to make connection with all important trains yet late enough to give business men a half morning or even a half day in their offices and still get into Brownsville by mid-afternoon in time to transact business.

The schedule on the Houston run, which is a short line, being only 249 miles long, is arranged so that the business man of Dallas and Fort Worth can spend four hours in Houston and still return to Fort Worth and Dallas by dinner time.

Air-rail hook-ups have also been arranged for the convenience and time-saving of the traveler. One of these is between Mexico City and New York, bringing those two cities within 48 hours of each other. Traveling the air-rail route from Mexico City to New York, a passenger leaves Mexico City at 7:45 a.m. in the morning for Brownsville over the line of the Mexican Aviation Company, a subsidiary of Pan-American Airways, where he takes the S.A.T. plane for Dallas, arriving there at 7:20 p.m. At 11 o'clock he boards the "Katy Limited" of the Missouri, Kansas & Texas Railroad for Tulsa, where he arrives at 7:59 a.m. in time to catch the Central Air Lines plane for Kansas City. From Kansas City to Cleveland he flies with the Universal Air Lines and then makes the last lap of the journey by train which will carry him into New York at 9:50 in the morning, the second day after he left Mexico City. The trip from New York to Mexico City has been similarly worked out.



Passengers boarding an S.A.T. Fokker Universal at Fort Worth

Amarillo where he will connect with the Western Air Express which will put him into Los Angeles within 30 hours after his departure from Brownsville or Houston. The passenger could leave Mexico City in the morning, connecting with the S.A.T. plane at Brownsville in time to get into Fort Worth for the western connection.

A second step in making air travel inviting is in arranging as far as possible for the convenience of passengers. The S.A.T. Flying Service, Inc., maintains free taxi service from its airports into the cities and keeps a uniformed steward at all its division points to assist the passengers with their baggage and tickets. The planes are kept scrupulously clean and provided with magazines, smoking equipment, ice water, and toilet room. A name-plate in the cabin introduces the neatly uniformed pilot to the passengers. On the long runs extending through the noon hour, arrangements are made for luncheon at no expense to the passenger.

A number of these arrangements were worked out in response to criticism offered by passengers at the invitation of the traffic department.

The ticket and reservation system has also been worked out so as to operate with dispatch and with the least possible inconvenience to the passenger. Ticket offices are located at some hotel or traffic office at every stop on the lines. At Dallas, Fort Worth and Houston special ticket offices are maintained, at the two former cities in conjunction with the Braniff Division of the Universal Air Lines system, which is, like the Southern Air Transport, Inc.,

a unit of the Aviation Corp. A system of reservations has been worked out whereby seats are assigned to various division points and smaller points must make reservations with the nearest division point. Reservations are made by telephone, telegraph, or over the Southern Air Transport's own short wave radio system. Reservations are also made on trains with which the plane connects, and the passenger, if he chooses, may buy a ticket straight through to his final destination, receiving from the air ticket agent a prepaid order which he presents at the railway station for his Pullman ticket. If he is traveling over the S.A.T. Flying Service system and the Universal Air Lines system, (Continued on page 106)

#### SCHEDULES & MILEAGE—S.A.T. PASSENGER ROUTES

Westward (Read down)		DALLAS-EL PASO (Route 80)		Eastward (Read up)	
Daily	Miles	Miles		Daily	
Lv. 12:00 N	0	Dallas	579	Ar. 2:00 PM	
Lv. 12:25 PM	30	Fort Worth	549	Lv. 1:30 PM	
Lv. 1:25 PM	121	Breckenridge	458	Lv. 12:35 PM	
Lv. 2:00 PM	174	Abilene	405	Lv. 12:00 N	
Ar. 2:30 PM	215	Sweetwater (x)	—	Lv. 11:30 AM	
Lv. 2:45 PM	—	Sweetwater (x)	364	Ar. 11:15 AM	
Ar. 3:10 PM	278	Big Spring	301	Lv. 10:35 AM	
Lv. 3:20 PM	278	Big Spring	301	Ar. 10:25 AM	
Lv. 3:45 PM	317	Midland	262	Lv. 10:00 AM	
Ar. 5:15 PM (*)	579	El Paso (*)	0	Lv. 6:30 AM	

(\*) Mountain time (x) Lunch

Southward (Read down)		DALLAS-BROWNSVILLE (Route 81)		Northward (Read up)	
Daily	Miles	Miles		Daily	
Lv. 8:30 AM	0	Dallas	547	Ar. 7:20 PM	
Lv. 8:55 AM	30	Fort Worth	517	Lv. 7:00 PM	
Lv. 9:55 AM	84	Waco	433	Lv. 6:00 PM	
Lv. 10:55 AM	180	Austin	337	Lv. 5:05 PM	
Ar. 12:00 N	286	San Antonio	262	Lv. 4:15 PM	
Lv. 12:30 PM	—	San Antonio	262	Ar. 3:55 PM	
Lv. 2:00 PM	416	Corpus Christi	131	Lv. 2:30 PM	
Ar. 3:45 PM	547	Brownsville	0	Lv. 1:00 PM	

Southward (Read down)		FORT WORTH-HOUSTON (Route 82)		Northward (Read up)	
Daily	Miles	Miles		Daily	
Lv. 8:00 AM	0	Fort Worth	249	Ar. 5:30 PM	
Lv. 8:25 AM	30	Dallas	219	Lv. 5:00 PM	
Ar. 11:00 AM	249	Houston	0	Lv. 2:30 PM	



# ENGINEERING OF AIRPORTS

By B. A. Slater

*General Manager,*

*Airports Engineering and Construction Corp.*

THE strides of the aviation industry have been measured largely by the construction of ports for its planes to land on. Adequate airports are a prime essential for the safe operation of air transport lines, an indispensable necessity for the less experienced pilot of privately owned aircraft. If civilization follows the plow, no less surely will aviation advance as the airport frontier recedes.

The work of Airports Engineering and Construction Corp., a part of the Southern Air Transport division of Aviation Corporation, consists in the construction of modern complete airports that will fit the needs of the community or city as well as the private individual or corporation. The municipalities have taken the lead in the construction of airports, the company has noted, but there is now noticeable a reaction on the part of the authorities against this phase of municipal activity. It has not been the experience of the Southern Air Transport group, however, that this means a lessening in airport development, but rather that this important work will be carried on by chambers of commerce, public spirited citizens and other individuals who see the great possibilities of profit in airport ownership and operation. Several airports in the Southern States are being constructed by private citizens—others by stock companies in which ownership is vested in groups. The Southern Air Transport engineering department makes a particular effort to encourage and stimulate such activities, as well as to offer its services in the perfection of plans and actual construction.

The work of the company in construction begins when its representatives have aroused a city to its need of an airport. Then a complete analysis is made of the situation, and naturally enough the first item that comes up is the selection of the site. This selection is made by considering its location in respect to the business center, other airlines, railroads, highways, public utilities, obstructions, drainage, value of land and opportunities for future expansion.

After the selection of the field has been made, the next problem encountered is the arrangement the site selected, in such a way as to make fullest use of the land available. The major problem to be taken care of is the drainage of the field. A survey party is put to work to prepare a contour map showing all the physical features and the surrounding terrain, including the mapping of highways, streets, telegraph, telephone and electric and steam, all water, gas, and sewage lines, all elevations of all obstructions on or near the site, including elevation above sea level, crops or other vegetation, including trees, character of ground and lastly, the important item of wind direction, showing the different percentages of winds at all angles.

Airport engineering is a critical point in the development of a field, considering that the next move determines

the success or failure of the port. They must locate all buildings at such a point best to serve the landing field, surrounding highways and transportation facilities.

Drainage must be well taken care of, first with reference to the natural inclines, and second by artificial methods. It is vastly important that both of these methods take care of all waters deposited on field, leaving it dry at all times and in fit condition for safe landing. Some fields require an elaborate system of under-drains using perforated or open jointed pipe to carry off water. In the case of the Menefee Airport at New Orleans, a system of underground perforated pipe was used to carry waters to open ditches and from which it is pumped by large pumps of 700,000 G.H.P. capacity over dikes that surround the field. It is noteworthy to add that on one occasion an extreme rainfall of nearly eleven inches in sixteen hours was easily taken care of.

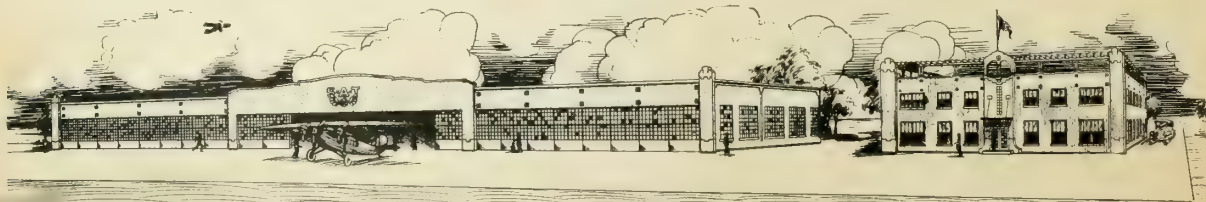
There must be provided, if possible, a field upon which planes may land and take off in any direction. This is naturally the most desirable but is a type which is only obtainable where soil, grade and construction conditions permit. The type that is usually selected is that which has the directional landing strips to conform with Department of Commerce regulations, constructed of either concrete, macadam, gravel, oil and sand, and other materials and methods peculiar to certain localities. All other parts of the field must be cleared of all obstructions and vegetation, brought to conform to an easy grade, and sodded to permit emergency landings of planes. The North point and name of the field is placed where most easily discernible from the air, and a landing circle, one hundred feet in diameter, is placed in the center of the landing field.

After the field has been put in condition for the proper landing and taking off of planes the various buildings necessary for the proper operation of an airport must be constructed. Hangars of ample size must be built to house the ships and protect them from the elements. A machine shop for making the necessary repairs to motors, a dope room for painting and fabric repairs and a stock room for the handling of parts must be provided. These units may either be constructed as separate buildings or included in the same structure, depending on the amount of money available.

Other facilities desirable in a well designed airport are oil storage tanks and reclaiming houses, underground fueling tanks for planes, motor test houses for observing performance of motors while running, and azimuth tables for compensating compasses on ships.

The field operators and passengers must also be considered. An administration building, incorporating offices for the various field employees and a waiting room

(Continued on page 108)

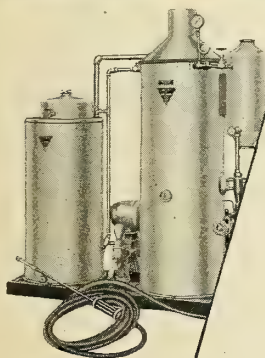


Artist's sketch of S.A.T. administration building, shop and hangar being constructed at Dallas, Texas



# TRIDEX

USED BY SOUTHERN AIR TRANSPORT



SOUTHERN AEROMOTIVE SERVICE, INC.  
APPROVED WRIGHT PARTS AND SERVICE DEALERS



GENERAL OFFICE  
 FORT WORTH NATIONAL BANK BUILDING  
 FORT WORTH, TEXAS  
 November 6, 1929.

The Guiberson Corporation,  
 Dallas, Texas.

Gentlemen:

We have had many complaints on the cleanliness and features of our passenger and mail line planes operating over the South. We owe much of this credit to the Tridex units stationed at most of our fields. By using these units we eliminate much fire hazard and have much cleaner airplanes than by using the old method of cleaning by hand and gasoline.

Very truly yours,  
 SOUTHERN AEROMOTIVE SERVICE, INC.  
*H.B. Taylor*  
 H.B. Taylor,  
 General Manager.

ERT:LN

FLY YOUR MAIL



The TRIDEX spray of soft, warm soapy water is harmless to human skin, but deadly to grease and dirt. TRIDEX cleans an airplane twice as efficiently and in one-half to one-third the time required by any other method—and at much lower cost of labor and operation.

The coupon will bring full particulars.

MAIL THIS COUPON

THE GUIBERSON CORPORATION, Dept. A,  
 Box 1106, Dallas, Texas.

Gentlemen: Please mail me without obligation, full information and prices on your Tridex Cleaning Unit.

NAME .....

STREET .....

CITY ..... STATE .....

R. R. SAFFORD COMPANY, Exclusive Southwestern Distributors,  
 P. O. Box 931, Dallas, Texas



# SERVICES RENDERED BY S.A.S.

LITERALLY, "S. A. S." means Southern Aeromotive Service, Inc., a part of the Southern Air Transport unit of the Aviation Corporation. But actually, it has come to mean that any flier, from the barnstormer urging on an old crate to the transport operator flying trimotors on schedule, has at his call at eleven points over a wide territory the most complete service for the maintenance, repair, and overhaul of aircraft which can be found south of the Mason-Dixon Line. Second, it means that he can have any item from one of the most extensive stocks of aeronautical supplies in the country on the way to him, wherever he may be, within a few hours after his order is received. Third, it means that when he needs any assistance, he will have the eager response of men who understand his problems from hours in the air and time at the workbench.

Wherever Southern Air Transport is in the air, Southern Aeromotive is on the ground; at all division points of the S. A. T. system, S. A. S. maintains branches of its own, for it is charged with the maintenance of all S. A. T.'s flying equipment. Although this work was its first reason for being, a wise policy separated the maintenance division of the parent company into a self-administered, but closely allied, organization, offering to fliers in general the facilities made possible by the needs of S. A. T.'s flying units.

Carrying out the idea, older with Southern Air Transport than S. A. S. itself, of encouraging flying generally by providing every assistance possible to operators and private owners, the concern has made available to the public the same high standard of service which early won for it the representation of the Wright Aeronautical Corporation. An important consideration to prospective airplane buyers throughout the South has naturally been the knowledge that they would have access to the complete repair and overhaul service and supply stocks of S. A. S. At a time when such facilities were noticeably lacking in the Southern territory, the maintenance of S. A. T. equipment justified the establishment of a chain of service stations manned by expert mechanics. Starting with Fort Worth and Houston, the network of branches has been thrown out to include at present El Paso, Amarillo, Big Spring, Fort Worth, Dallas, Waco, San Antonio, Brownsville, and Houston, in Texas; and New Orleans and Atlanta. At any of these points complete motor and airplane service is offered.

At Dallas overhaul and rebuilding is concentrated in spacious, new buildings on Love Field. Any kind of motor work is handled, in a completely equipped repair shop. Airplane engines of any type are repaired and overhauled by skilled, licensed mechanics of long experience, who do their best work because they are furnished the best and most modern tools and equipment that can

By Louis Puster

Assistant General Manager,  
Southern Aeromotive Service, Inc.

be bought. These include test stands where assembled motors are given a factory running-in and check. The whole procedure of motor work as practised here has been approved by the leading manufacturers. Under factory trained men, with equipment supplied or recommended by the manufacturers, a separate department is maintained for the servicing and

repair of aircraft magnetos, carburetors, and instruments. Compasses are compensated on a specially designed azimuth turntable which reduces a formerly long and tedious task to a job requiring only a few minutes, and insures accurate readings. Special tools and special training provide an important service which is unique in that part of the country.

Also located at Dallas is the main aircraft shop, under the direction of Sterling Ward, an old-time airplane maintenance expert, where planes or any of their parts are made "as



Loading a propeller on a plane for an emergency delivery

good as new." Complete rebuilding of crack-ups is a specialty. The welders, wing builders, metal workers, painters, and riggers in the Dallas shop have been recruited from the most skilled and reliable mechanics available. The majority of these workers, in fact, have had experience in airplane factories, and are fully qualified to turn out work in accordance with manufacturers' specifications and the requirements of the Department of Commerce.

New Orleans, serving the wide territory between Atlanta and North Texas, where service for fliers was for so long non-existent, offers at Menefee Field the same facilities for motor work as Dallas, including test stands and a modern shop in new buildings. Instrument repair and service work is done, and compasses are compensated on an azimuth turn-table similar to the one at Dallas. Visiting pilots here receive the same attention to their equipment as is given to the mail planes of Gulf Coast Airways, flying over some of the "toughest country" south of the Alleghenies.

Each of the other S. A. S. branches maintains a staff of government licensed mechanics with the actual experience necessary to the proper servicing of aircraft, outfitted with a service station kit of tools and equipment, including a welding outfit. Each branch carries a representative stock of motor parts, miscellaneous supplies, and accessories. The pilot wanting his clearances checked and his oil drained, or a dragged wing-tip repaired, or in need of a map of the country ahead, can land at an S. A. S. airport, and find what he wants. In case of a demand for some article not regularly stocked at a branch, an order will see the shipment aboard the next air express from Fort Worth or some nearer point, or on the next train. In urgent cases a special plane is dispatched, affording delivery within a matter of minutes at the most isolated cow pasture in the territory. Witness a customer flying



from Tulsa to have his motor overhauled at Fort Worth recently; in a small field where he landed along the way he nosed over and bent his steel propeller. Within thirty minutes after he had reached the nearest telephone an S. A. T. plane was in the air, carrying a new propeller to the stranded plane. The propeller installed by the S. A. S. mechanic, the ship completed its journey, and the motor was overhauled; and by the time the motor was finished, the original propeller, straightened, acid-washed and inspected for cracks, polished and balanced like new, was ready to be mounted.

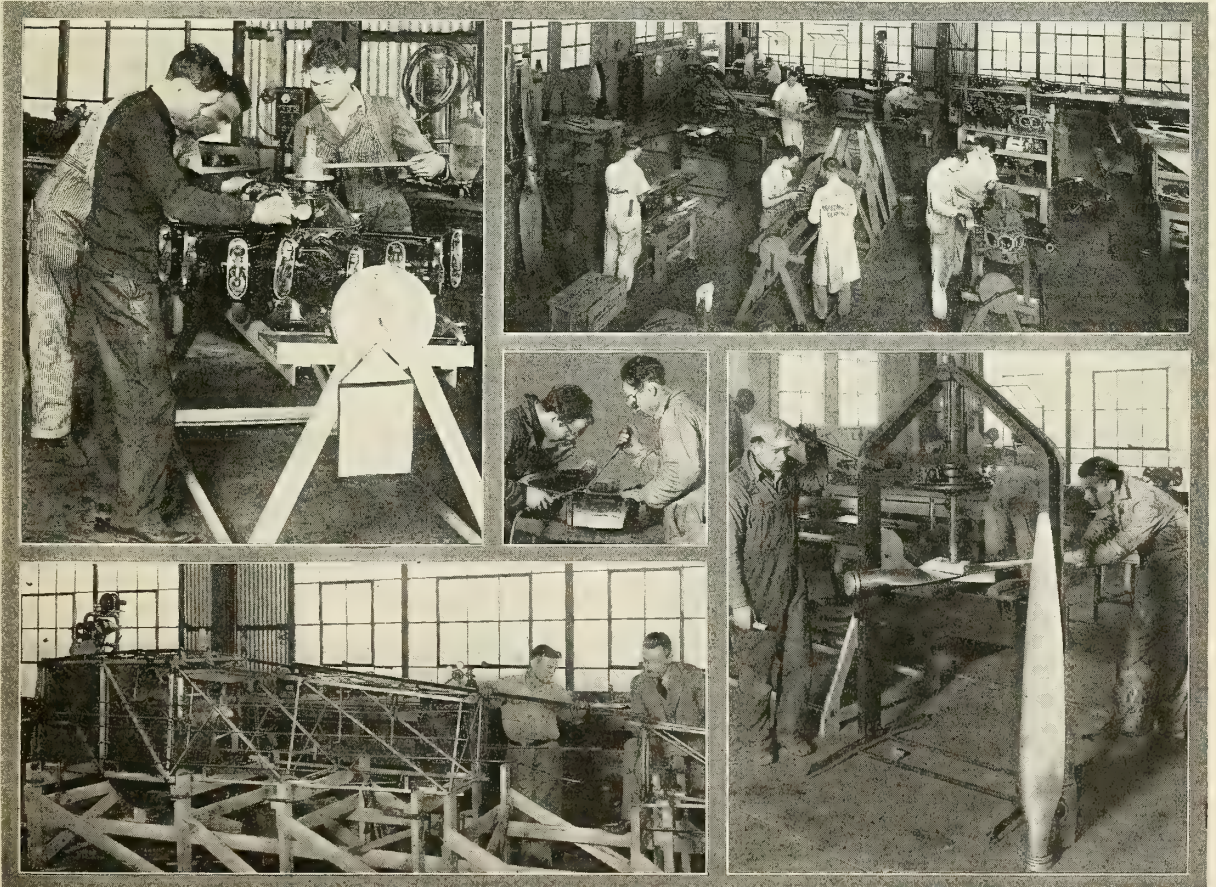
In a business where minutes often mean dollars, this "hot-shot" service is more than attractive. The same promptness is observed in the main warehouse at Fort Worth, where mail orders are filled from a centrally located, downtown department, within four minutes of all express and freight offices. Here there is always a complete stock of aeronautical supplies, one of the most extensive in the country, which include parts for the leading modern aviation motors, flying accessories, and a line of miscellaneous supplies, besides shop equipment such as hand tools, electric machine tools, welding outfits, and S. A. S. engine stands, propeller surface tables, etc. An order received here, whether for a stick of airplane spruce for a wing spar, a bolt of fabric, a can of dope, a tire, or a strip map, is promptly packed and shipped, and is on the way within the day. Keeping a main stock at a central point of the territory in this manner works for efficiency in serving operators, for a more diversified assortment, and more slow moving articles can be carried



One of the warehouses of Southern Aeromotive Service

than if each branch attempted to have on hand all that might be needed. Since all branch stocks are centrally controlled, and a constant record of each branch's stock is kept at the main office, routing of shipments can be arranged to make delivery as rapid as possible, a shipping order being given the nearest branch to the customer for the goods desired.

One contributing cause for the service dispensed by this organization is the fact that every member of the company has an understanding of the needs of a flying operator, and is in a position to give eagerly the intelligent assistance which is the only kind that will do. H. B. (Pete) Taylor, general manager of S. A. S., and original maintenance superintendent of Texas Air Transport, before the formation of the present company, is a pilot of twelve years' experience, with three thousand hours flying time; and his efforts and his knowledge have done much to place the concern in its present position.



S. A. S. shop scenes: timing a Wright Whirlwind engine; machine shop and engine overhaul department; rebuilding a steel tube fuselage; straightening the blades of a metal propeller and (center) welding an engine exhaust muffler



# MEETING AERONAUTICAL SALES PROBLEMS

**A**VIATION, in its rapid expansion, has encountered the same problem that has occupied the experts of older industries for many years—that of distribution, the physical process of conveying products from the producer to the consumer at a minimum of energy and expense. And young as it is, the aeronautical industry is meeting the problem surprisingly well.

It has labored under difficulties that might have vanquished a less viable business and has created a semblance of order out of formless confusion. It has had to cope with a misinformed public which has clutched to its bosom fallacies of the most virulent sort. It has been obliged to train its own personnel before it could mould an organization to fit the needs of the business. It has had no established contacts, no standards of comparison, no foundation on which to build its distribution system, and a highly specialized and unorganized market. But labor to establish these factors has been enthusiastic, intelligent and unceasing, and already order is beginning to emerge from the chaos.

Different companies have met their problems individually. The Southern Air Transport, Inc., a unit of the Aviation Corporation, has evolved a system that it believes to be unique among operating companies, and one that is proving singularly effective, in organizing a separate sales division to distribute all the products which it handles. Responsibility for the arrangement of distributorship contracts, the establishing of contacts, and the actual distribution of products has been centered in one individual, who has worked out his own organization, to which he, in turn, deals out duties and responsibilities.

The creation of the sales division is the product of experimentation that has proved the wisdom of the centralization policy. At first, products distributed by the company were handled by organizations already existing, fitting the selling of the various supplies and accessories as nearly as possible to the primary function of the division. For instance, the Southern Aeromotive Service, one of the subsidiaries, was held responsible for the marketing of aeronautical supplies, and the T. A. T. Flying Schools, Inc., was entrusted with the sales of aircraft, since every successful student was a prospective purchaser of a plane.

Gradually the necessity for a unified system became apparent. The sales division was organized and made responsible for the sale of everything from soap to airport equipment. General divisions of the products distributed are: aircraft, aero supplies, including parts and accessories, and airport engineering and equipment.

The sales organization as it now stands is composed of a general sales manager, an assistant sales manager, divisional managers, regular salesmen who work under the divisional managers whenever in their territory, sub-dealers covering parts of the country in which no regular division points have been established and individual owners

By Hugh L. Smith

General Sales Manager,  
Southern Air Transport, Inc.



Hugh L. Smith

of aircraft who sell on commission basis.

One of the largest single items for which the sales division is responsible is the sale of aircraft. Here arose one of the chief problems the division had to meet. Who is a prospect for a ship? Thousands of inquiries concerning aircraft helped the situation but little, for it was obvious that all of them could not be "contacted" without a tremendous waste of time and money. The sales manager and his staff were obliged to develop a sort of sixth sense to "size up the situation" and determine whether or not a given "prospect" was truly a prospect or only some individual bent merely upon demonstrating his progressive spirit.

Several satisfactory sources of prospects have been established. All inquiries sent to factories are referred to the distributor. These letters are sorted and filed in a file of "active prospects" and "inactive prospects." Sorting such inquiries makes one of the heaviest calls on the judgment of the staff. The wrong guess may mean unnecessary expenditure in pushing sales, or the loss of a good prospect. To preclude the latter possibility, all inquiries are answered and the status of the doubtful ones is determined by the responses.

Another source is through pilots and other members of the organization and friends of the company. Here, too, the sales division gets many a false lead. Individuals anxious to show their interest in and knowledge of aviation are always dropping in with a "hot tip," which may have no foundation whatever. Many people who appear to be prospects ask for demonstrations when as a matter of fact, they desire only a free ride. These possibilities go through the same sorting systems as the letter inquiries.

Other sources of prospects come from the traffic department in the names of regular passengers over the lines, or individuals of wealth or position who make special taxi trips. Figures have been compiled to enable the frequent passenger to determine whether or not it would be a financial advantage to own and operate his own plane. In the event these figures prove it to be cheaper to own his own ship, it is usually not difficult to close a deal with a business man, and this is, accordingly, one of the best sources of contacts.

Another excellent source is through flying schools. Any student is a prospective airplane owner, particularly since Department of Commerce regulations and standards of operating companies demand such extended experience in the passenger-carrying pilots. Since the Southern Air Transport operates seven schools, this is one of the best sources of prospects that the sales division has.

Other sources are contacts made by the salesmen in "hopping passengers" when he is out on the road,—a practice that incidentally, usually pays the expenses of the salesman while away from his base; from the repair stations over the Southern Air Transport system; and in the



TRAVEL AIR...THE STANDARD OF AIRCRAFT COMPARISON



## PREFERENCE FOR TRAVEL AIR

again confirmed, by members of the Long Island Aviation Country Club, America's most exclusive air club

Sportsmen the country over thrill at the Travel Air's brilliant performance, its remarkably quick take-off and unfailing ability to land at slow speeds... combined features that have brought Travel Air sales larger than any other plane sold in the United States. "The exclusive Long Island Aviation Country Club roster shows that out of nineteen various makes owned by members, over 22% are Travel Air—the remaining 78% being distributed among eighteen other manufacturers. "Here again the complete confidence of air-minded sportsmen is expressed in outstanding preference for Travel Air. Illustrated Booklet, "The Story of Travel Air," mailed upon request.

# TRAVEL AIR

WICHITA, KANSAS

Division of

CURTISS-WRIGHT CORPORATION

Sales Offices: 27 West 57th Street

New York City



private owners of aircraft. Practically every airplane owner is a prospect for a new ship eventually, and the sales division keeps an up-to-date list of all such individuals in its territory. The owner's name and address, type of ship and motor, Department of Commerce number, and other such pertinent information is kept, and any change in ownership is immediately noted in these files.

Clinics, doctors, oil operators, contractors, cotton, wheat and stock brokers, and any such professional or business men whose work demands speed or covers a large territory are automatically listed as prospects.

This mass of information collected from such different sources is sorted and filed so as to be immediately accessible to the manager and his salesmen. The filing system includes a master card which is a permanent record, and a removable card with a signal system showing when the card is out, indicating that the prospect is being "contacted" by a salesman. The active file is given constant attention and is altered from day to day. Direct-by-mail contact is maintained and the prospect is called upon regularly until he either buys a ship or is definitely out of the market. In the latter case, his card is removed from the active and filed in the inactive file. At intervals, letters are sent out to the inactive file, which may result in changes of names to the active list.

The sale, when consummated, is made on a basis similar to that used in automobile sales. Time payments are allowed, and in the case of the owner of a used ship, allowance is often made on the old plane. After the sale, free checking service is given, a service that more than pays for itself in the sale of parts and accessories.

Difficulties that have retarded the results of this system have been numerous. One of the most formidable is the lack of information on the part of the public concerning aircraft. Most prospective owners have no notion whatever of what to expect of a ship. Color, appearance, and other such obvious details are considered, frequently at the expense of the performance. The sales department, then, has established itself as an "information bureau" that furnishes with alacrity any information on any phase of aviation. Sales books containing information on every ramification of the industry are issued to the salesmen, divisional managers and sub-dealers, that they may assist in this mission of education.

Another difficulty has been in finding salesmen who were also pilots, or pilots who could sell. The combination is a rare one, and the sales manager has been in a constant dilemma as to whether pilots or salesmen could be produced at the least cost. Since aircraft salesmen must be expert pilots and unusually well-versed in all phases of aviation, the tendency is usually toward teaching pilots to sell.

Another problem that has proved an Alps for many distributors is the lack of servicing organization to serve the planes sold. With the Southern Air Transport, Inc., this has been reduced to a minimum by a system of servicing stations operated by the Southern Aeromotive Service, Inc., covering the whole South, so that a plane owner can scarcely fly to any part of the South or Southwest where he is not in the territory of one of these points. The operating system of the Southern Air Transport has proved a boon as well to the sub-dealer who can coöperate with a near-by division point in servicing of his ships, exchange of stock, etc.

The system that has been worked out to take care of aircraft sales also solves the marketing problems on the other aeronautical products which the company distributes.

Aircraft salesmen, divisional managers, and sub-dealers are also salesmen for aeronautical supplies and airport engineering and equipment. These men gather data on airports, spot prospective cities or companies for the sale of airport engineering and construction, and report to the Airport Engineering and Construction Corporation, which then makes surveys and estimates. The sales department handles all material to enable the construction company to turn out a "turn key" job from leveling of ground to lighting.

Accessories are sold in the same way. All division points are supplied with a display case to help them push the sale of accessories. Supplies are also marketed through the servicing department of each division and at all service stations over the country.

An aeronautical catalog has been prepared to further the sale of supplies and accessories. The catalog is furnished to all salesmen, to aircraft owners and other active prospects, and is calculated to build up a large mail order activity.

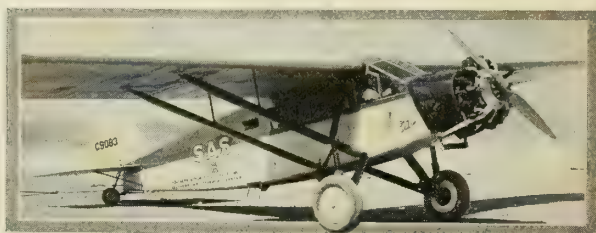
When the expenditure seems prudent, promotional advertising is used. One medium used with frequent regularity is Station KSAT, described in another article in this issue of AERO DIGEST.

During the State Fair of Texas at Dallas, the largest of the state fairs of the United States, with an attendance this year of more than one million persons, the sales department had an exhibit in the automobile building. One of the planes it sells was suspended from the ceiling of the building. In the booth were shown a complete line of accessories, and the exhibit included an engine display. Throughout the day and evening, motion picture trips over the passenger lines of the Southern Air Transport system, as well as tours through the factories of some of the manufacturers represented, were exhibited.

Where there is an aerocade over the state or region, and at airport celebrations where there is a large attendance of fliers and plane owners, the "Flying Showcase" is entered. This is a plane equipped with display cabinets and especially painted. Various accessories are displayed in the windows of this airplane and wherever it goes large crowds are attracted by it. Sales of goggles, flying suits, and other items have been made repeatedly on the fields and during the air meets, as well as on the aerocades in which the "Flying Showcase" of the Southern Aeromotive Service is a feature.

Although the idea behind the establishment of Southern Aeromotive Service by Southern Air Transport was one of increasing sales revenues, the good will which has resulted must be included in the dividends.

This sales organization has been evolved in a very short time, and has admittedly not reached perfection. But it has blazed a trail in the wilderness and has laid down a foundation upon which the company believes a sales system comparable to that boasted by far older industries can be built.



The "Flying Showcase" of Southern Air Transport

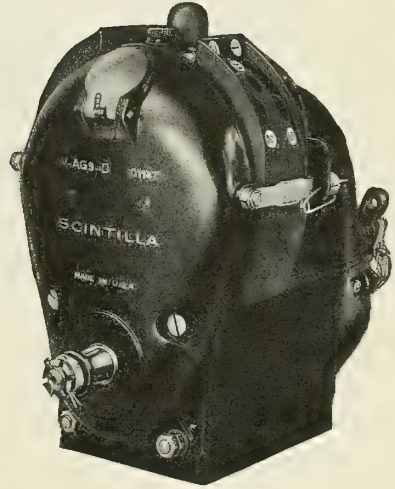


# SCINTILLA

## AIRCRAFT MAGNETOS

**PERFORMANCE  
THAT COUNTS!**

The majority of modern  
American Aeronautical Engines  
are equipped with  
Scintilla Aircraft Magnetos.



Scintilla Aircraft Magnetos have won the entire confidence of  
Mechanics and Pilots by their proven Reliability in the severe  
service of commercial operators.

**Scintilla Means  
DEPENDABILITY  
SIMPLICITY and  
ACCESSIBILITY**

Scintilla Aircraft Magnetos can be obtained  
for engines of from one to eighteen cylinders.

**SCINTILLA MAGNETO CO. INC.**  
**SIDNEY - NEW YORK**

Contractors to the U.S. Army and Navy





# FLYING MAIL AND EXPRESS ON FOUR SOUTHERN AIR ROUTES

**A**IR mail in Texas had rough skies to fly when it was first inaugurated almost two years ago. The Texas Air Transport, Inc., was awarded a contract to carry air mail on C.A.M. 21, operating from Dallas and Fort Worth to Houston and Galveston via Waco, and on C.A.M. 22, operating from Dallas and Fort Worth to Austin, San Antonio and Laredo, the terminus on the latter route having since been changed to Brownsville via Corpus Christi.

Fitted out with a fleet of four planes, the company made ready to give wings to the state's business. But business seemed quite content to plod its earthbound way. Merchants and business men did not trust air mail's speedy soaring. Important letters they refused to commit to its care and they considered the charge of ten cents unwarranted on less important mail. Air mail, then, was regarded largely as a novelty and used for social correspondence.

The experience of the St. Tammany Gulf Coast Airways, Inc., which has been changed to Gulf Coast Airways, Inc., and become associated with the Texas Air Transport in the formation of the Southern Air Transport unit of the Aviation Corporation, was much the same. It began operation on C.A.M. 23 from Atlanta, Birmingham and Mobile to New Orleans in May 1928, and nine months later put into operation C.A.M. 29 from New Orleans to Houston. As in Texas, air mail was regarded as an experiment.

Undaunted by the widespread lack of confidence, the mail continued to go. The pilots flew over unlighted airways through fog and rain when discretion advised remaining on the ground, determined to prove to the incredulous public the practicability of air mail. And the poundage began to climb steadily.

Aside from this consistent delivery of the mail, a number of other factors entered into the increase in poundage. Lighting of airways and the improvement in equipment, both contributing to the maintenance of excellent service, and the decrease in the cost of postage from ten cents to five have had a part in it. But the chief factor has been the steady effort on the part of the traffic department to educate the public to its use without seeking in any way to bring about any artificial or spectacular uses of the air mail facilities furnished by the Post Office Department.

To that end, the traffic department employs five traffic representatives, stationed at strategic points along the lines, with a territory to cover regularly. These men have distributed posters which have been displayed on air mail trucks, in hotel lobbies and other public places. They have distributed air mail schedules to every postoffice box and business office at every point on the route once a month. They have made personal calls on potential users, gathering data which was sent into the main office for filing and follow-up letters.

All this effort has borne abundant fruit. Air mail pound-

*By Julian Lyles*

*Ass't General Traffic Manager  
Southern Air Transport, Inc.*



One of the Stearman planes used on T.A.T. air mail lines

age has climbed steadily. C.A.M. 21 carried during the first month of operation 1,543 pounds. Eight months later poundage had been doubled and in February one year later it carried 4,069 pounds. C.A.M. 22 carried during the first month 2,060 pounds, doubling also in eight months, and carrying one year later 7,706 pounds. C.A.M. 23 in its first month of operation carried 3,144 pounds and six months later carried 9,698 pounds. C.A.M. 29 carried in its initial month's operation 1,421 pounds, jumping within six months to 6,234 pounds. This has been achieved because business men have learned the superior facilities offered by air mail, and not because of any high pressure methods.

Air mail users are now numbered among all the progressive businesses. Banks, insurance companies, merchants, bond and mortgage companies, building and loan companies, and oil companies are among the largest users. Banks in the South save at least \$15 a day net gain through the use of air mail in cutting down the loss of interest on their money. Insurance and loan companies save in sending to the large eastern centers for confirmation of policies and loans. Merchants render better service to their customers and cut down their investment through the use of air mail.

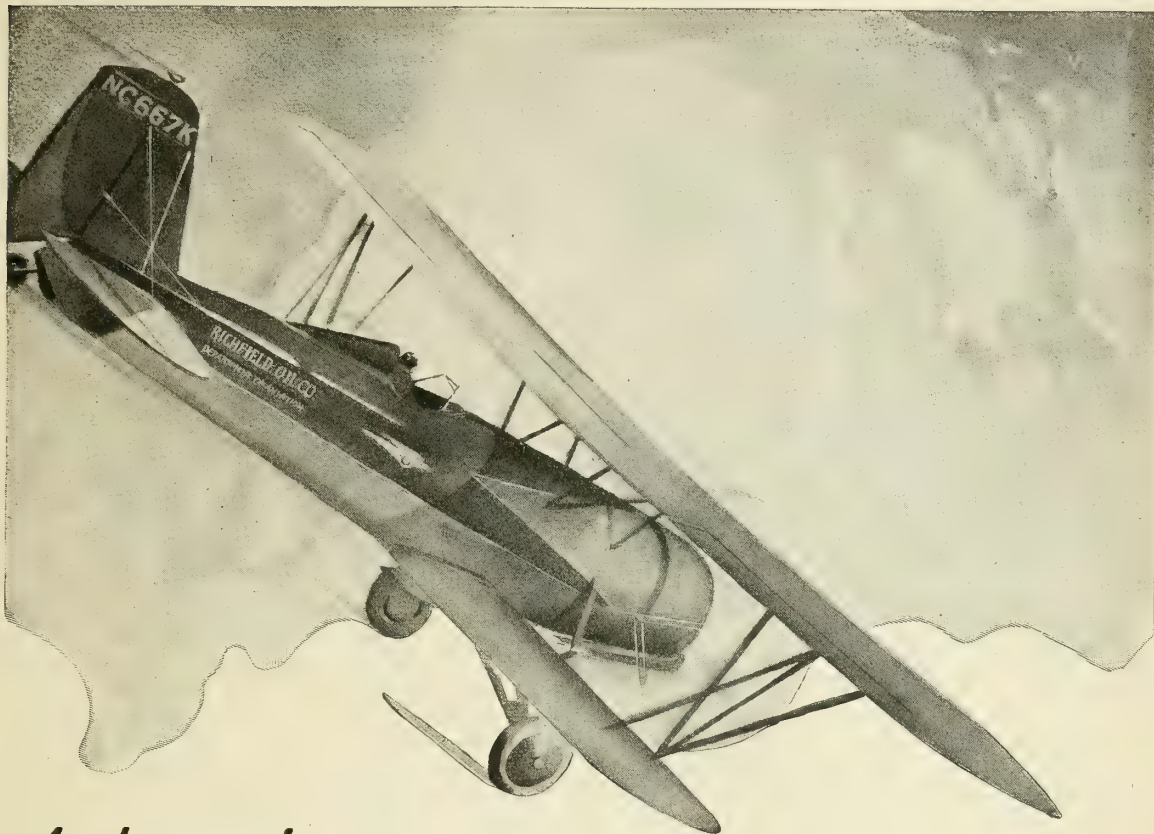
The Texas Air Transport and the Gulf Coast Airways carry air express as well as mail, though in Texas this function is left largely to the passenger lines of the Southern Air Transport, operated from Brownsville to Dallas and Fort Worth; from Houston to Dallas and Fort Worth; and from Dallas and Fort Worth to El Paso. Air express was inaugurated because of the insistent demand of merchants and business men in general of the South for a mode of transportation when the train proves too slow.

In addition to carrying the express, the company offers pick-up and delivery service at terminal and junction points throughout the South. These points include Atlanta, Ga.; Birmingham, Ala.; New Orleans, La.; Houston, Waco, San Antonio, Brownsville, Dallas, Fort Worth and El Paso. Packages for delivery to all other points on the lines are accepted at the sender's risk provided his agent will be at the field of destination to receive them.

The tariff is based on a zoning system similar to that employed by the parcel post service. The rate is eight cents per pound per hundred miles, with a minimum charge of 25 cents. In addition, there is a pick-up and delivery charge of 50 cents additional on each package, regardless of its weight or the distance carried.

The air express of Southern Air Transport has been of frequent service to oil operators, saving them the tremendous overhead cost of keeping their men and machinery idle while extra parts could be shipped by rail. One recent example of such service is that given an oil supply company at Big Spring, Texas.

*(Continued on page 106)*



*And now the*

# STEARMAN

## *Junior Speedmail*

LINE SHIPS, these Stearmans, whether for sport or service.

Among those who are up on aviation, Stearman is held in high regard. The pilots, our good friends, like the feel of the stick, the kick of the throttle, the maneuverability... and the Stearman owners, of course, are keenly enthusiastic. For instance, Dudley M. Steele of the Richfield Oil Company wired Nov. 2nd.

"Congratulations to you on the building of a truly

marvelous airplane... motor and plane behaved beautifully... flies hands off... exceptionally stable and rides rough air very smoothly... motor at 1700 does 110 on air speed which is about 4 or 5 miles slow... performance exceptionally good."

You'll want to know more about the new Stearmans—wire, phone or write the factory... THE STEARMAN AIRCRAFT COMPANY, WICHITA, KANSAS, Division of United Aircraft and Transport Corp.

### BRIEFLY

Junior Speedmail—Quickly converted into three-place job. Powered with a Wright Whirlwind 300—Top speed, 143 M. P. H.—Cruising speed 118 M. P. H. at 1700 R. P. M.—Pay load, 716 lbs.—Cruising radius, 730 miles. (All Stearman performance figures are conservative and based on average conditions at varying altitudes.) The Junior Speedmail is stressed for a Pratt & Whitney Wasp, the performance figures for which will be available shortly—write for them.







## FLYING MAIL AND EXPRESS

(Continued from page 104)

The company received a rush order for an oil well plug at 9:30 in the morning. The order was phoned in to Fort Worth and the plug was in the air at 11 o'clock. At 2.30 it was at the well ready to run. Five hours from receipt of the order in Big Spring the plug was in the well, 240 air miles from the supply source.

In another case an investment of a little more than a dollar brought the manager of a sign company a return of \$70. The company was installing a Neon electric sign in a Texas city and was obliged to order a certain sort of connection wire from Chicago. Using the fastest means of transportation outside of air express would have meant a delay of four days at the cost of \$35 a day for labor idle. The air express cut this delay to two days.

Again, an airplane wheel, shipped by the Curtiss Robertson corporation, made the trip from St. Louis to Mexico City in two days when the fastest train time is five. Aeronautical supplies are one of the commonest items shipped. Airplane owners and operators are well acquainted with the saving effected through the use of the airplane, and when supplies for ships are needed, these are usually sent either by special plane through the Southern Aeromotive Service or shipped by air express.

A wide variety of vegetables and animals have been sent over the air express lines; parrots, dogs, bees, horned toads, fresh fish, dogs' and cats' heads being sent to an institute to determine whether or not they had been suffering from rabies. Cabbage and figs are listed among the shipments by air express over S.A.T. lines. Jewelry and clothes are among the more frequent articles shipped.

Air mail and express have proved themselves, and now are entering an era of well-deserved patronage. With the improvement of equipment, so that schedules may be speeded up, and the illumination of more airlines so that night transport may be operated over the whole country, the service will continue to improve and its use will become more and more popular.

## OPERATING PASSENGER LINES OVER AIRWAYS IN TEXAS

(Continued from page 95)

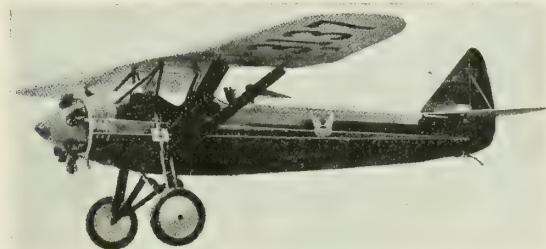
the arrangement is further simplified, for that company accepts S.A.T. Flying Service ticket coupons.

To keep the system uniform, the traffic department issues numbered bulletins and instructions to traffic agents, divisional managers, and ticket agents giving information concerning the procedure in making out tickets, making reservations, any changes in schedule and other such information.

The traffic department has recently been made responsible for cross-country and taxi trips to carry passengers to points other than those on the regular lines. Customers for such trips will be contacted through the same channels used in stimulating travel over the scheduled system, thus increasing that source of revenue without additional cost. Many oil operators, owning land in the famous fields of West Texas, charter planes for inspection of their various properties.

This is the system that is now in operation and one that adequately covers the field at present. The plan, however, is a flexible one that can be altered to fit conditions as they change.

# You can't know it Until You Fly It



Manufactured under Department of Commerce Approved Type Certificate

THE DAVIS D-1 is *not* a pursuit plane—and *not* a modified transport plane. The D-1 has been engineered and built—from the very beginning—to be just what it is: An airworthy, dependable, light two-place plane, with the stability and performance hitherto achieved only in larger, heavier and higher-powered planes. The victories of the Davis Monoplane in the All-Ohio and Kansas-Missouri Class A Derbies, by wide margins, are evidence of the basic soundness of Davis design and construction.

The Davis D-1 has unusual stability in rough weather—the result, largely, of its unique and exclusive wing design. It is sturdily built to withstand hard service and rough treatment (all metal throughout, with exception of wing spars). This, plus the performance data below will tell you *something*—but only a flight can tell you *everything*.

Davis Aircraft Corporation, Richmond, Indiana

Southwestern Sales Representatives  
Southern Air Transport, Inc.

### PERFORMANCE (Actual)

	LE BLOND 60	KINNER 100
Service Ceiling .....	10,000 feet	12,000 feet
High Speed .....	95 M. P. H.	130 M. P. H.
Landing Speed .....	38 M. P. H.	40 M. P. H.
Cruising Speed .....	80 M. P. H.	100 M. P. H.
Climb .....	700 ft. per minute	1200 ft. per minute
Fuel Consumption at Cruising Speed .....	4 1/2 gal. per hour	6 gal. per hour
Cruising Range .....	300 miles	400 miles

Supplied Complete with  
either LeBlond 60 H.P. or Kin-  
ner 100 H.P. Radial Engines

# DAVIS MONOPLANE

"Sold under licenses covering all of the patents owned by members of the Manufacturer's Aircraft Association, Inc."



# NATION-WIDE SERVICE!

*Dealers and  
service stations  
conveniently  
located*

NOT CONTENT with merely producing aerial life-saving equipment of unusual merit, this company has also established nation-wide Dealer and Service organizations for the convenience, comfort and safety of flyers everywhere.

Schooled by Direct Factory *Flying Representatives* who have visited every major airport in the last few months, Russell "Lobe" Parachute Sales and Service Representatives at 100 airports and aerial supply stores are now prepared to give you quick delivery, expert service and helpful information on the parachute that has been adopted as standard flight equipment by veteran flyers, air transport companies, flying schools and aerial passengers the world over. . . . The parachute that has never failed to open in an emergency and bring its load safely to the earth.

Have you seen the latest Russell Parachute pack? It fits right into the seat of the airplane. With this new pack you fasten and unfasten the parachute harness while seated in the cockpit--just as you do the safety belt! It's very convenient, simple--and remarkably comfortable.

Ask about the Russell "Lobe" Pongee Silk Parachute selling at \$275. Other models, \$250 or \$350, F. O. B., San Diego or New York.

*Descriptive Folder and Name of Nearest Service Station on Request*

**Russell Parachute Company**  
1202 Kettner Bld'g San Diego, Calif.

EASTERN SALES OFFICE:  
122 East 42nd Street  
New York City.



*For owners of*  
**RUSSELL "LOBE"  
PARACHUTES**



# ON GUARD!

Between You  
and High Costs

## Kester Solder Company

Formerly Chicago Solder Company  
Established 1899

4253 WRIGHTWOOD AVENUE  
CHICAGO, ILL., U.S.A.

**KESTER SOLDER**  
FLUX-CORE



## MICA AVIATION SPARK PLUGS

are recommended and used as standard equipment by the leading aviation engine manufacturers of the United States to ensure the performance of their motors.

B. G. plugs in the engine are a proof to the passenger that every precaution is being taken for his safety.

## THE B. G. CORPORATION

136 WEST 52nd STREET  
NEW YORK, N. Y.

SCOUTS HERRN AIR TRANSPORT SYSTEM

### ENGINEERING OF AIRPORTS

(Continued from page 96)

for passengers, must be built. A restaurant, pilots' club, roof garden and other concessions may be included in the design of this building according to the sources of revenue they provide.

On fields where flying school activities are carried on, barracks and class rooms must be constructed.

Lighting for night guidance and landing of planes is provided for in the following manner: A revolving searchlight beacon visible from all directions which attracts the attention of the approaching aviator and directs him to the airport is essential. It is usually installed either top of a tower or on the highest point of the buildings.

The shape and extent of the area on which operations may be conducted are marked very definitely both by day and by night. White boundary lights consisting of a series of lights set three feet above ground and three hundred feet apart, served by an underground distribution system is placed around the entire field. Green approach lights are set to indicate the direction of runways. All obstructions which come within a seven to one gliding angle of the edge of the field are marked with red globe obstacle lights. Flood lights are placed in such a manner as to provide an even distribution of illumination over the entire usable portion of the landing field. The exterior surface of all hangars are flood-lighted. An illuminated wind direction indicator is placed where readily distinguishable from the air. A ceiling projector is provided to show the heights of clouds or ceiling.

### ITALIAN AERONAUTICAL INDUSTRY

(Continued from page 74)

the famous Asso 500, which was ready at the end of 1926 and which was the first engine in Europe to stand the test of 150 consecutive hours with a complete load. The engine met with such success that the company put into production the following series of engines, all of the water-cooled type:

250 horsepower.....	6 cylinders.....	in line type
500 horsepower.....	12 cylinders.....	V type
1000 horsepower.....	18 cylinders.....	W type
750 horsepower.....	18 cylinders.....	W type
450 horsepower.....	12 cylinders.....	V type
100 horsepower.....	6 cylinders.....	in line type

Fiat. The engine department of the Fiat constructs the following types:

A.20...	400 hp...	water-cooled...	12 cylinders...	V type
A.22...	500 hp...	water-cooled...	12 cylinders...	V type
A.25...	950 hp...	water-cooled...	18 cylinders...	W type
A.50...	85 hp...	air-cooled...	7 cylinders...	radial type

Both the Fiat and the Isotta-Fraschini are preparing new engines to be run by naphtha.

Romeo. The Romeo produces the British Jupiter air-cooled engines and the British Lynx. It also is preparing an air-cooled engine of its own design.

Colombo. This company carries out repairs and builds its own air-cooled types.



## Power that does not *flinch* under the grueling test

**A**PPROXIMATELY 90% of the chartered air transport companies operating in the United States today use Wasp or Hornet engines because of their reserve power and dependability—sterling qualities which have been built on millions of miles of flying experience.

Southern Air Transport—one of many of these operators—uses Wasp powered Fokkers on their Dallas-El Paso route. In the last seven months their Wasps have flown 1,876 hours covering 187,675 miles. Dependable flying power is essential to successful air transport

operation. Night and day through the Highways of the Sky, Wasp and Hornet engines are in operation under all conditions. Carrying passengers, mail and express, these engines fly a distance far greater than around the world every twenty-four hours.

Their steady drone brings peace of mind to those who travel by air. Whether it be over the torrid carpet-green jungle tops or the frozen antarctic wastes, they provide the power that does not flinch under the grueling test of exacting demands not only in commercial service but in military service as well.

THE  
**PRATT & WHITNEY AIRCRAFT CO.**  
HARTFORD • • • CONNECTICUT  
*Division of United Aircraft & Transport Corporation*

Manufactured in Canada by Canadian Pratt & Whitney Aircraft Co., Ltd.,  
Longueuil, Quebec; in Continental Europe by Bavarian Motor Works, Munich.



# Wasp & Hornet Engines

S ~ O ~ U ~ T ~ H ~ E ~ R ~ N ~ A ~ I ~ R ~  ~ T ~ R ~ A ~ N ~ S ~ P ~ O ~ R ~ T ~ S ~ Y ~ S ~ T ~ E ~ M



# PROMOTING AVIATION by RADIO

**D**EVELOPMENT of an air-minded public through the air's own medium, radio, is now an accomplished fact for the first time, following formal opening of the aviation industry's premier radio station, K-S-A-T, "In the Air, On the Air, Everywhere," from Fort Worth, Texas.

Founded on a commercial basis, with the view of providing the best in entertainment features to the listening audiences of the nation, KSAT, owned and operated by S.A.T. Broadcast Company, a subsidiary of the Southern Air Transport division of the Aviation Corporation, has made a distinct impression both from the standpoint of interest in music and in aviation.

Meteorology talks are prepared and given twice each week by P. D. Lampert, assistant manager of operations of S. A. T. These "weather man chats," breezy and instructive, and highly entertaining and understandable by the uninitiated in aviation, are proving very popular, and serve to create a real interest in flying conditions and the reasons therefor. Lampert emphasizes the fact that transport aviation companies keep in constant touch with weather conditions to vouchsafe safety for passengers. Schedules of passenger service on the Southern Air Transport lines are given to the public each day, while bright little messages of what is transpiring in the aviation world go on the air from time to time.

Once each week, KSAT features an hour's program of the best talent obtainable, sponsored by the Southern Air Transport. A fifteen-piece orchestra, directed by the South's most prominent orchestra leader, Hyman Maurice, is the background for this program. The orchestra, which is also the regular staff unit of the station, is known by the euphonious title of the "Aviation Corporation Aviators."

Frequently A. P. Barrett, president of Southern Air Transport and vice president of the Aviation Corporation, and other aviation authorities and executives go before the microphone with an inspiring message of aviation accomplishments, aims, hopes and desires. These talks are proving immensely valuable from an instructive standpoint. This conclusion is reached from the letters received at the studios of the station, located on the mezzanine floor of The Texas, Fort Worth's leading hostelry, with inquiries as to various facts about aviation following such talks. These letters come from all parts of the United States.

Three nights weekly, KSAT features a late (or rather early) hour broadcast that goes on the air from 12 midnight until dawn. This program, called "Flying The Sunrise Trail with KSAT," has proved exceedingly popular in all sections of the United States, Canada, Mexico, and as far away as Hawaii and South Australia. The aviation idea is constantly back of this featured entertainment. Re-

By A. W. (Tiny) Stowe

*Studio Manager, Radio Station KSAT*

quests are granted in all sections of the country, in answer to long distance calls and telegrams. The entertainers pile into a mythical

cabin plane of the Southern Air Transport, and "fly to the home of the listener with the request." An airplane effect is given to the program by use of "studio effects"—either an electrical transcription of an airplane motor, or a garden variety fan with paper bounding against the blades to create the motor hum being heard back of the announcements. The idea is proving very pleasing to the listeners, who are organizing all-night parties to "fly the sunrise trail" with KSAT.

Whereas most radio stations invite response from the listeners, in return sending out Ekko stamps as means of verifying reception, KSAT has printed a beautiful sixteen-page booklet, attractively designed and printed in two colors, with a personal message of verification, thanks and invitation to continue as regular listeners of aviation's only owned and operated radio station from the station

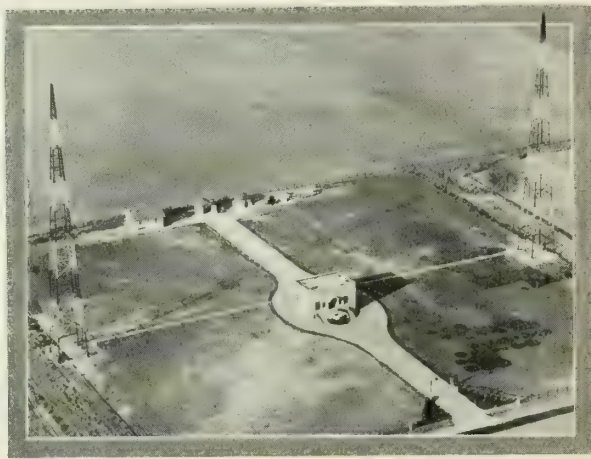
management, a letter from A. P. Barrett, with an outline of aviation's goal and its rapid strides, a complete description of the Southern Air Transport system, attractively set off with pictures of S. A. T. planes, airports, and a double page spread of featured entertainers of KSAT. Each letter received from a listener calls for mailing one of these booklets in response, and the message of aviation is being introduced attractively thereby into homes all over the country.

Studios of the station carry in design the aviation idea. Sanicoustical tile panels on the walls of both the solo studio and the ensemble studio are painted with open window effects, with drifting cloud effects behind latticed trellises, with S. A. T. cabin planes in flight being painted on each panel. Soft mural shades, the latest indirect lighting effects, and modernistic furnishings complete two of the most attractive studios in the southwest. The studios are also equipped with a ventilating system supplying 2,000 cubic feet of washed air per minute—a new and pleasant feature for radio stations of the South.

Specialized continuity is prepared for all programs of the station, and wherever possible, the hum of an airplane is used as background, proving very effective.

In operation since October 21, the station has had more than 4,000 letters and over 2,000 wires and long distance telephone calls through November 15. KSAT operates on a frequency of 1,240 kilocycles, 241.8 meters, by authority of the Federal Radio Commission, using 1,000 watts power, having completed installation of the latest model Western Electric equipment and transmitter.

So now aviation is "In the Air, on the Air, Everywhere," with KSAT, Fort Worth, Texas. Tune in on aviation's own program.



Transmitting department of radio station KSAT, Fort Worth

# THE AIR SERVICES

## MECAVIATOR TESTED BY ARMY AIR CORPS

EQUIPPED with the Mecaviator, an automatic pilot using the stabilizing qualities of the gyroscope, a Ford trimotor transport recently flew from Wright Field, Dayton, Ohio, to Bolling Field and on to Long Island, piloted by mechanical means. Except in take-off and landing, the pilot of the plane was seldom required to touch the controls of the ship. Lieut. A. F. Hegenberger, Major A. F. Gilkeson and Elmer A. Sperry, Jr., co-designer with his father of the piloting device, were passengers in the first public demonstration of the gyroscopic pilot.

The Mecaviator, which occupies little space beneath the pilot's seat, actively controls the plane through the ordinary system of controls. Two gyroscopes are mounted in the automatic pilot; one on a horizontal axis of rotation, the other on a vertical. Once set in the proper attitude for normal flight, the gyroscopes tend to maintain this position. When the plane assumes an attitude other than that of level flight, it moves about the gyroscopes, making contact with an electrical circuit which actuates the proper controls to return the plane to normal flight.

Mr. Sperry, Jr., and his father, head of the Sperry Gyroscope Company, have worked with engineers of Wright Field in the testing of the device.

## INFORMATION WANTED ON TROPHY WINNERS

MAJOR GEN. JAMES E. FECHET, Chief of the Army Air Corps, is seeking information about eight former fliers of the Air Corps, or their heirs, who are entitled to a medal representative of the Mackay Trophy, but who have not as yet claimed this medal. Each year the Mackay Trophy is awarded to the flier or fliers of the Army Air Corps participating in the most meritorious flight or flights of the year. When more than one airman participates in the flight, each is awarded a medal representative of the trophy.

The whereabouts is being sought of the following former fliers or their heirs, whose medals are being held for them:

Colonel Townsend F. Dodd, winner of the Mackay Trophy in 1914, for a reconnaissance flight. Colonel Dodd was killed before receiving the medal.

Lieutenant Belvin W. Maynard, the "Flying Parson," one of the crew of the Atlantic-Pacific and return flight in 1919. Lieutenant Maynard resigned before receiving the medal.

Lieutenant R. S. Worthington, also one of the crew of the Atlantic-Pacific and return flight in 1919. Lieutenant Worthington resigned and was soon after killed before receiving the medal.

Lieutenant D. B. Gish, also one of the crew of the Atlantic-Pacific and return flight

in 1919, resigned before receiving the medal.

Captain Clinton F. Woolsey, one of the crew of the South American Good-Will Flight in 1926. Captain Woolsey was killed during the course of the flight.

Sergeant Edmund Henrique, one of the crew of the Alaskan Flight in 1920. Sergeant Henrique was discharged upon expiration of his term of enlistment before receiving the medal.

## ANALYSIS OF NAVAL AVIATION ACCIDENTS

THE Navy Department has completed a study of all accidents occurring in Naval Aviation during the past eight years, with the object of learning from the underlying causes of the accidents how best to avoid or reduce such occurrences. Two years were required to complete the report. This study showed that the predominant responsibility for crashes rests on the pilot and that the most dangerous period for a flier is at about his 200-hour mark.

Other facts brought out in the analysis are as follows: While the pilot is responsible for less than one-half the non-injury accidents, he is responsible for three-fourths of the fatal ones. The infrequent flier is the most dangerous pilot. The study showed that if a pilot quadruples his frequency of flying he will almost halve his accident hazard, even though he is in the air four times as much. The seasoned flier has only one-third as many accidents as the recent graduate from a flying school. The past records of pilots who eventually have a fatal accident, killing either themselves or others, show that they had almost two and one-half times as many accidents as those who never figured in such catastrophes.

The detailed causes of accidents are analyzed as follows:

Errors of pilot .....	52 per cent
Power plant failures .....	18 per cent
Structural failures .....	13 per cent
Condition of airport .....	9 per cent
Weather .....	2 per cent
Supervising personnel .....	2 per cent
Miscellaneous .....	4 per cent

The detailed causes of errors of pilots are as follows:

Faulty flying technique .....	63 per cent
Faulty judgment .....	19 per cent
Carelessness .....	14 per cent
Violation of safety regulations ..	4 per cent

The detailed causes of power plant failures are as follows:

Failures of the fuel system .....	48 per cent
Failures of the ignition system ..	13 per cent
Failures of the lubrication system .....	12 per cent
Failures of the engine structure ..	10 per cent
Failures of the propeller .....	6 per cent
All other causes .....	11 per cent

More accidents occur on Thursdays than

on any other day of the week. No reason was determined for this fact, and further study is being given to determine the exact reason therefor.

Almost one-half of the fatal accidents which occur come as a result of the tail spin. Of these, 94 per cent occur without engine failure and 80 per cent from an altitude of 200 feet or less, where insufficient height remains for a proper recovery from this condition. The safest type of aircraft which the Navy has is the training airplane; while the fighting plane, equipped for high speeds and required for use in complicated and dangerous missions such as aerial gunnery and tactical work, stands lowest.

## IMPORTANT DATA EXPECTED FROM LONG RANGE PHOTOGRAPHS

LONG-DISTANCE aerial photographs recently made by the Army Air Corps are expected to produce important data relating to the curvature of light rays around the surface of the earth, according to a recent announcement of the War Department. The work done in connection with making the photographs is also expected to develop methods of long-distance photography which will prove of value in time of war, the War Department stated.

The photographs were made during the past summer on a 14,000-mile aerial photographic tour of the northwestern part of the United States made by Capt. Albert W. Stevens, chief of the aerial photographic unit of the materiel division, Wright Field, Dayton, Ohio, with Lieut. John D. Corkville of the Army Air Corps as pilot. The fliers put in more than 140 hours of flying time on the trip. A photograph of Mount Ranier was taken from a distance of 227 miles at an altitude of 17,000 feet above a landmark which could be identified on a map. Photographs of Mount Ranier were also obtained from a distance of 214 miles. In the 227-mile photograph mountains far beyond the eye's range were clearly visible.

The photographs were made on film sensitive to the invisible infra-red rays that penetrate smoke and haze. In the picture, Mount Ranier appeared lower than the other mountains in the foreground because of the curving of the earth's surface, although in reality it is higher. The photographer could not see the objective and was obliged to point the camera in the direction of Mount Ranier and await the development of the film to view the result.

The camera used in making the photographs of Mount Ranier was an Army K-6, using an Eastman 500 mm. focal length lens, Kryptocyanine hypersensitized film, and red filter. The airplane used in making the photographs was a CO-8 DeHavilland fitted with Loening amphibion wings and powered with a Liberty engine.



## MASTER-RING LAID FOR ZRS-4

**A**CTUAL construction of the Navy airship ZRS-4 was started on October 31 with a ring-laying ceremony, in which the beginning of ring assembly, comparable to the keel laying of a battleship, was marked by formal ceremonies which included the driving of the first rivet in the center ring. The ZRS-4 is the first of two rigid airships which the Goodyear-Zeppelin Corporation will construct for the United States Navy at Akron, Ohio, where the company is also erecting the world's largest airship factory and dock in which the two airships will be built. The construction of the ZRS-4 began before the airship hangar was completed, though the erection of the building had progressed to an extent which permitted work on the ZRS-4 to get under way.

When completed, the ZRS-4 will be larger than any rigid airship constructed up to the present time. It will have a length overall of 785 feet, or approximately fifty feet greater than the overall length of the British airship R-101, which recently made its initial flight from Cardington, England. The nominal gas capacity of the ZRS-4 will be 6,500,000 cubic feet, or approximately 1,000,000 cubic feet greater than the nominal capacity of the R-101. It will be inflated with helium gas and will have a gross lift of 180 tons. The airship itself will weigh ninety-eight tons, leaving eighty-two tons of useful load. It will carry a crew of forty-five.

One of the features of the design of the ZRS-4 is the absence of external cars hanging below the gas bag of the airship for the accommodation of the engines. Provision is made in the design of the ZRS-4 to house the engines within the hull of the airship. Brackets from the hull will support the propellers which will be driven by the engines through transverse shafts and bevel gears. This system of transmission is so designed that the propeller axes can be turned into a vertical position to exert an upward or downward thrust in addition to the forward thrust. By the use of this mechanism the propellers will be made to

assist in taking off or landing the airship. Eight engines will be installed on the ZRS-4 within the hull of the airship and, with the reduction in air resistance obtained by the absence of external cars, the maximum speed of the airship is estimated, by the aeronautical engineers who designed it, at 84 miles per hour. The normal cruising speed will be 60 miles per hour. Translated into speed and distance, the airship will have a cruising range of 2,500 miles at her maximum speed, and over 10,000 miles at her normal cruising speed.

Another outstanding feature in the design of the ZRS-4 is the provision for an airplane hangar within the hull of the airship. This hangar will have a capacity of five scouting planes. These planes will leave or enter the hangar by means of a trapeze which will swing through sliding doors constructed in the floor of the hangar, and on the under side of the dirigible. Planes to be used in connection with the airship will be equipped with special hooks on the upper wings for attaching to the trapeze.

The ZRS-4 and the ZRS-5 will be used by the Navy for operation with the fleet. According to present plans, one will be based on the West Coast and one in the East, and they will be used by the Navy to study the possibilities of cooperation of rigid airships with surface fleets and with airplanes. The new dirigibles are expected to bring new developments in aerial tactical operation through their ability to use planes in their missions. Two more of these ships, modified for aerial passenger, mail and express service, are planned by the Goodyear-Zeppelin Corporation for use in a dirigible service across the Pacific Ocean.

The hull of the ZRS-4 will be constructed of duralumin longitudinal and transverse girders with steel wire bracing. Eleven separate cells of gas-tight fabric will contain the buoyant helium. Provision is made for three longitudinal corridors, and passageways extending around the circumference of each main transverse frame. They will give access to all parts of the airship so that inspection and repairs may be readily made

during flight. Quarters to accommodate the crew of 45 are provided and will compare favorably with those provided on cruisers and destroyers.

The design of the ZRS-4 is well on the road to completion. Production of the two girders which comprise the main portion of the airship's structure began several months ago. The program, in the construction of the ZRS-4 includes the erection of a complete section of the airship and its subjection to structural tests. The first section will be completed in the spring of 1930. Erection of the remainder of the airship will be completed about July, 1931, when test flights will be made. The second of the two rigid airships which will be constructed by the Goodyear-Zeppelin Corporation for the Navy, the ZRS-5, will be completed about the end of 1932.

The Goodyear-Zeppelin Corporation has practically completed the erection of the world's largest airship factory and dock at Akron, Ohio, which will be used for the construction and housing of the ZRS-4 and ZRS-5. The hangar is also the largest structure in the world without interior supports. The building is approximately semi-paraboloid in shape—its transverse sections forming parabolas and its longitudinal sections forming two half-parabolas connected by a straight line. In general, the structural design of the airship dock consists of eleven parabolic arches, spaced eighty feet on center and connected by a system of vertical and horizontal trusses.

The length of the hangar is 1,175 feet between the center lines of the door tracks, its width is 325 feet at the center, and the height of the platform at the middle is 211 feet. The interior floor area of the hangar is 364,000 square feet and it has a cubical content of 45,000,000 cubic feet. Some idea as to its size is conveyed by the fact that it could house 56 blimps the size of the *Defender*, the largest of the Goodyear fleet, and that its height is equal to a 22-story building.

Particular attention has been devoted in the design of the Goodyear airship hangar to the problems of launching and docking the airships. Consideration of the fact that

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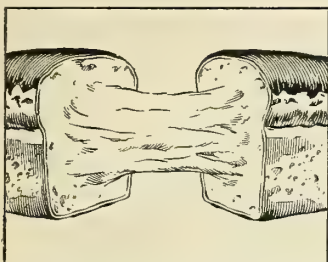


Dr. Karl Arnstein, designer of the Navy dirigible, ZRS-4, addressing the crowd at the ring-laying ceremony; and (right) Rear Admiral Moffett driving the first rivet in the master-ring of the dirigible

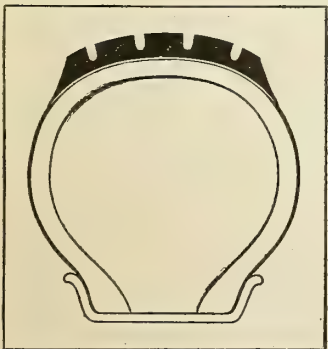
# Cords that are *Stretch Matched* and Rubber that is "*Water Cured*"



4 MORE STRETCH-MATCHED cords to the square inch give Goodrich Split-Second Silvertowns just that much more needed strength and resiliency. They give Goodrich Tires a margin of safety and performance.



THE WATER CURING principle of slow baking, as applied to bread, would have prevented this soggy, uncooked interior. Goodrich Water Cured Tires are evenly baked all the way through insuring uniform strength and elasticity at every point.



## GOODRICH SPLIT-SECOND SILVERTOWNS

# *Make Take-Offs Quicker, Planes Swifter and Landings Safer on*

UNLIKE the tire on an automobile, the airplane tire is an integral part of the plane.

Puncture an automobile tire and you can control it with the steering wheel. But burst an airplane tire and over goes the plane.

Strength in airplane tire construction, therefore, is vitally important.

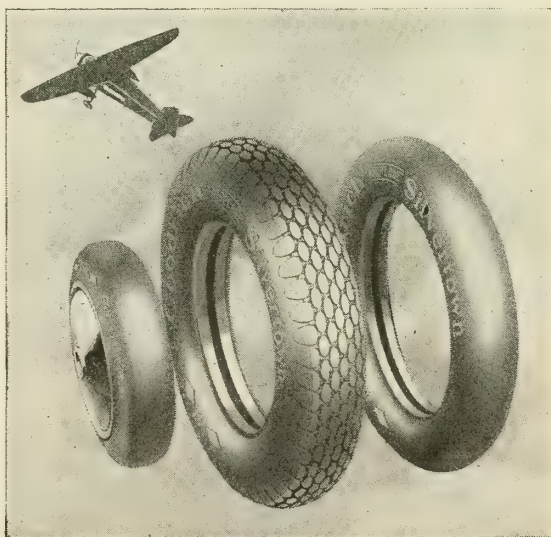
Goodrich has attained strength without sacrificing lightness of the tire and the plane's speed, by combining the stretch-matched cord construction with the famous Goodrich "water cure" rubber toughening process.

Every Goodrich airplane tire, therefore, is tough right on down

to the innermost ply. On the landing gears of airplanes they make take-offs quicker, the planes swifter and landings safer.

No mere claims need be made for Goodrich Split-Second Silvertowns... world records have proved them!

The B.F. Goodrich Rubber Company, Established 1870, Akron, Ohio. Pacific Goodrich Rubber Company, Los Angeles, Calif. In Canada: Canadian Goodrich Company, Kitchener, Ont.



GOODRICH TIRES are light of weight yet strong enough of construction to withstand take-off overloads on the worst of landing fields.

(Left) THE GOODRICH NON-SKID airplane tire has a special streamlined tread that enables pilots to take off on a water-soaked field without any noticeable reduction in flying speed.

# Goodrich

# *Rubber for Aviation*



(Continued from preceding page)

an airship hangar should not interfere with the normal wind currents, complicating docking and launching by cross-currents created by the building of open doors, suggested the general shape of the Goodyear airship hangar. The doors are built of arched and braced ribs. They resemble orange peels in outline and move on trucks.

Docking rails for moving the airships in and out of the dock consist of two parallel grooves. The tracks are spaced 200 feet apart and extend approximately 1,600 feet beyond each end of the building. A standard railroad track is placed along the center of the hangar. It will be used to carry a guide trolley that will keep the hull of the ship centered in the building and prevent the airship from striking against the sides of the dock.

Airship hangars of similar design although smaller have been constructed at Dresden and Liegnitz, Germany. Previous to the construction of the Goodyear-Zeppelin hangar, the largest airship docks in the United States were those at Lakehurst, N. J., and Belleville, Ind.

## PENSACOLA FLIGHT COURSES MODIFIED

THE training syllabus of the Naval Air Station at Pensacola has been materially changed as the result of a conference between Admiral Marshall and Navy Department officials. Under the new syllabus, membership of student classes will be increased to sixty every four weeks beginning with the class which convenes on January 3, 1930. Torpedo plane, aerial gunnery and advance combat training has been eliminated from the curriculum and will be given as a part of the regular Naval instruction.

The ground school course has been decreased from 510 hours to 330 hours, with 35 hours in navigation for Naval Reserve pilots, who will be given the same training as regular officers. Instruction time for officers will total 226½ hours and for enlisted men 160½ hours.

## New Parachute Tested at Wright Field

EXTENSIVE tests of a new type of parachute, which embodies several changes in construction and design as compared to the standard type of chute, are being conducted at the material division, Wright Field, Dayton, O. In the new parachute a triangular mainsail has been substituted for the circular mainsail now used on the standard type of parachute. Two corners of the triangle are rounded and the third is sheared straight across. The shroud lines extend downward, spaced regularly as in the standard chute, except across the sheared-off corner, which has no shroud lines attached. When the chute opens during a drop the portion of the mainsail adjacent to the sheared-off corner forms a tail-like vent through which the air escapes.

Results obtained recently from jumps and dummy drops with the new type of chute indicate a decrease in oscillation and shock load to the jumper on opening, and greater

manual steerability in descent. The air escaping through the tail-like vent of the mainsail propels the chute horizontally at a speed of from three to four miles per hour as it descends. Steering is accomplished by the manipulation of the shroud lines and direction is controlled by turning the parachute so the vent is with or against the wind.

## Selfridge Field Fliers to Perform Winter Tactical Mission

INCLUDED in the winter training schedule of the First Pursuit Group, stationed at Selfridge Field, Mount Clemens, Mich., is an air tour from Selfridge Field to Spokane, Wash., and return. Col. Charles H. Danforth, the commanding officer of the post, has been authorized by the Secretary of War to send 18 pursuit planes, accompanied by one transport plane, on the tour over a route which will be selected by an officer who will be sent in advance of the proposed flight. The end of the flight is to be not later than February 1, 1930.

The personnel on the flight will collect data concerning the difficulties of operating away from a permanent base in sub-zero temperatures, and in moving a large number of planes over present existing airways. The planes will be equipped with skis on the flight.

## War Department Orders Planes, Engines and Parts

CONTRACTS calling for engines, aircraft and parts totaling \$1,642,000 have been awarded by the War Department to the Douglas Aircraft Corporation, Curtiss Aeroplane and Motor Company and Keystone Aircraft Corporation. The Douglas company will supply thirty-six observation planes of the O-25-A type and thirty O-32-A training planes powered by Pratt and Whitney Wasp engines. This single order totals \$851,014. The Curtiss order totals \$747,270 and calls for seventy-two BVL engines and spare parts for the O-25-A planes ordered from the Douglas company. Each of the latter will be provided with a spare engine purchased from the Curtiss company. The Keystone company will supply \$44,099 in spare parts for Loening amphibians now used by the Army Air Corps.

## Capt. Wooten Sent to Chile as Military Attaché

CAPT. RALPH H. WOOTEN of the Army Air Corps has sailed for Chile to take up duties in Santiago as military attaché at the United States Embassy. Capt. Wooten is the first Army Air Corps officer to be appointed to the position of military attaché.

## THE GROWTH OF MARCH FIELD

By E. M. Slaughter

FROM an Army post of weed-grown lawns, shabby wood barracks and indeterminate rating, March Field has emerged and is now one of the better equipped and more fully developed posts of the Army Air Corps. Approximately \$3,000,000 has been expended in the construction of buildings, landscape work and the installation of field and shop equipment.

March Field is located at Riverdale, California, in the Northern Perrin Valley, on broad open land, and has every natural advantage at its command. It was established under the Army Air Corps five-year development program, and a primary training school has been conducted at March Field since November, 1927. Major M. E. Harmon is the commanding officer; eighty permanent officers are stationed at the field to instruct cadets and perform administrative and other duties. There are 175 students in the course of training at March Field, and this personnel will be augmented by 150 additional officers and cadets before the end of the year. Fifty West Point graduates recently arrived at the field to enter the primary training school in which they will be instructed this fall and winter.

During the past year and a half there have been completed thirty-six officers' residences, twenty non-commissioned officers' quarters, an administration building, eight hangars 110 feet by 200 feet, shops and technical buildings. An officers' club is located in the Bachelor Officers' building, and there is also a well arranged officers' mess. Decoration of the officers' club was done under the direction of a well-known Los Angeles

firm. A network of paved roads has been laid down and an extensive sanitary system has been installed.

Demolition of the old barracks, hangars and technical buildings is practically completed, and plans call for additional roads and landscape work to be done, with the entire construction program progressing rapidly to completion.

The general lay-out of March Field was approved by Major General Mason M. Patrick. The buildings are located at one corner of the field, set in rows along the edge at right angles. They are flanked by a transverse row of eight hangars opening directly onto the flying field. A main paved highway borders the field and buildings and the grounds are threaded with smaller paved roads and pathways.

The original plans and specifications which were approved by General Patrick included the construction of more than 225 buildings. In the plans, eight field officers' quarters were provided at an estimated cost of \$14,500 each, in addition to 109 sets of non-commissioned officers' quarters and four double barracks for squadrons. The plans also called for the construction of extensive recreational facilities including tennis courts, theatre, swimming pool and a large athletic field, radio station, a photographic laboratory, machine shops, a number of large garages and tire stations, water pump houses and garage oil and gasoline storage tanks.

There are now in use at March Field 118 planes, including sixty-three PT's, thirty-six DH4M's, seventeen O2-K's, one C2A and one PW9.





## Fokker Planes Fly Universal Lanes

Out of the sky comes the modern business man . . . refreshed, eager. Through the air . . . where the way is straight, swift, and clean . . . he saves many precious hours of wearisome travel, and finds that remote cities have become neighbors.

His trip is always pleasant, and relaxing. The world below drifts leisurely backward. Hills are mysteriously ironed away. Cultivated farmland reveals its beautiful checker-board pattern. Cities shrink to toy villages, their autos to June-bugs, their trains to tortuous snakes.

His reverie is arrested as the Fokker glides gently to its landing place . . . at Chicago, at Cleveland, at Kansas City, at St. Louis, at Tulsa, at Oklahoma City. "On time" always, in a Universal Air Liner.

Fokker planes have been chosen for Universal Air Line Systems to assure the speed, comfort and safety necessary for this modern and luxurious mode of travel.

Other commercial lines using Fokker super trimotor air lines are: Western Air Express, Southern Air Transport, Pan-American Airways, Standard Air Lines, National Parks Airways, Dominion Airways, Western Canada Airways.

*If interested in air travel, send a 5-cent stamp (to pay air mail postage), and we will send you our illustrated booklet, "When Air Travel Pays." Address the Fokker Travel Bureau, 23rd Floor, 292 Madison Avenue, New York City, Room 2300.*

## FOKKER AIRCRAFT CORPORATION OF AMERICA

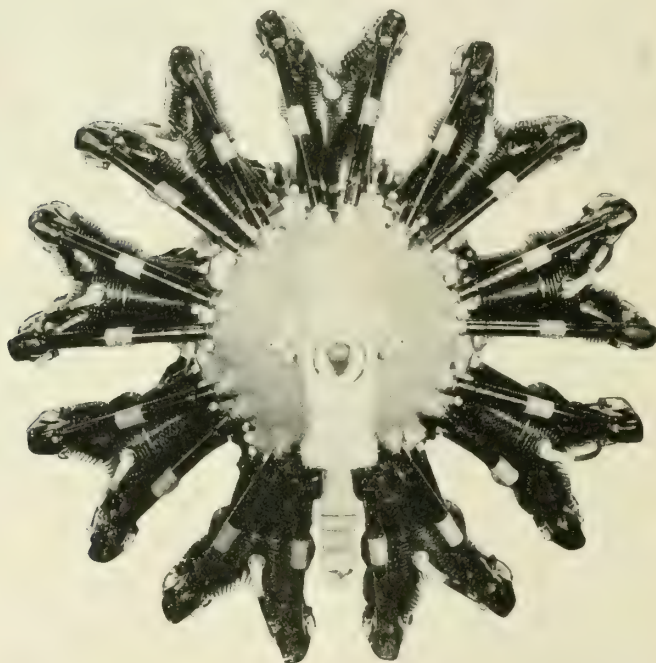
Factories: WHEELING, WEST VIRGINIA, and TETERBORO AIRPORT, HASBROUCK HEIGHTS, NEW JERSEY

Address inquiries: NEW YORK OFFICE, 1775 BROADWAY



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Another member  
of a famous family—

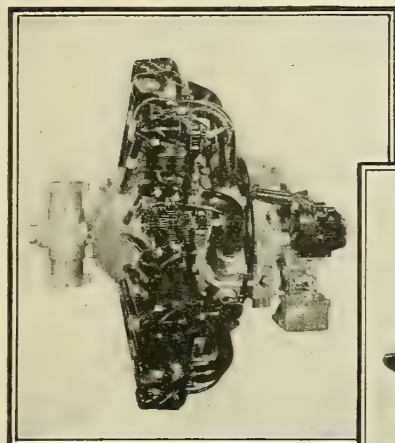


## Wasp Junior

a 300 H. P.

ENGINE, BY  
PRATT & WHITNEY

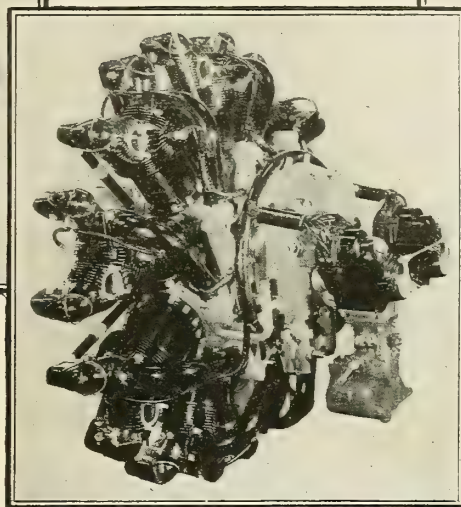




Full Side View

**To the individual owner**

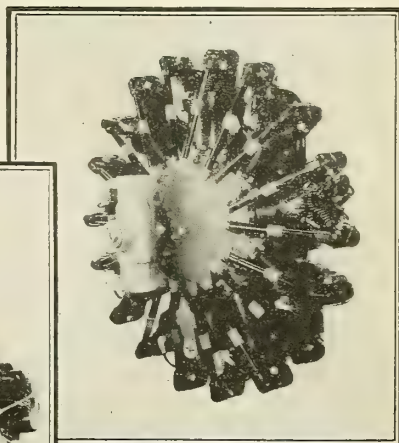
"Wasp Junior" combines dependability with high performance, low initial cost and economy of operation.



Three-quarter Rear View showing accessory section

**To the manufacturer**

"Wasp Junior" simplifies production problems by meeting customers' demands for differently powered and variously priced equipment with standard installations of these World-known engines.



Three-quarter front View

**To transport operators**

"Wasp Junior" brings a complete line of Pratt & Whitney engines from 300 to 575 h. p. . . serviced with a minimum stock of parts and one service contact.

A 300 H. P. "Wasp" . . . a product with a background of history . . . of outstanding achievement . . . a "Baby Wasp" . . . with 80 per cent of its parts interchangeable with those of the world-famous "Wasp" and "Hornet"—that's the "Wasp Junior" . . . which now invites your inspection and critical comparison.

New only in name . . . "Wasp Junior" combines expert engineering with the experience gained in millions of miles of flying.

It has all the performance characteristics that have made the names "Wasp" and "Hornet" stand for "dependable flying

power" under every operating condition.

Weighing 550 pounds and 45 $\frac{3}{4}$ " in diameter, "Wasp Junior" develops 300 H. P. at 2,000 r. p. m.

"Wasp Junior" was designed to meet the requirements for an engine of this size, having the dependability and long life that have made the "Wasp" and "Hornet" internationally famous.

To be manufactured in the most modern aircraft engine plant . . . now under construction . . . "Wasp Junior" will be produced to meet the full demands of the industry.

THE  
**PRATT & WHITNEY AIRCRAFT CO**  
HARTFORD • • • CONNECTICUT  
*Division of United Aircraft & Transport Corporation*

Manufactured in Canada by Canadian Pratt & Whitney Aircraft Co., Ltd.,  
Longueuil, Quebec; in Continental Europe by Bavarian Motor Works, Munich

**Wasp & Hornet**  
**ENGINE S**



# AIRPORT AND AIRWAY

*News of airlines, airports, and airways; radio, lighting and other auxiliary services*

## Passenger Traffic Not Seasonal

FOR some curious reason there seems to be a sudden increase in passenger travel by air in the United States, according to reports from all sections of the country which have lately reached this office. The football season might have something to do with it, but in sections of the country where interest in the sport is not as keen as in others, the volume of passenger traffic continues to increase at a gratifying rate. In the Eastern section, Colonial Airways has been running extra planes on its New York-Boston line regularly every week for the last two months. In the West, Western Air Express, West Coast Air Transport and Maddux Air Lines each exhibit augmented totals of weekly passenger traffic. In the Middle-West, Embry-Riddle, Universal Aviation and Stout Air Lines are among the companies whose passenger lists show rapid gains during the late summer and fall.

This succession of cheerful reports indicates that those persons who, last summer, insisted on a pessimistic view of the passenger traffic situation and claimed that as soon as the summer season was over, passenger business would decline, are as out of date as a last year's American Legion poppy. The present concern of the larger transport line operators is the need for additional equipment to take care of the capacity loads they are carrying. Southern Air Transport reduced fares some weeks ago, and since that time has been hard pressed to care for the greatly increased number of prospective passengers asking for reservations. Victor F. Grima, traffic manager of the line, states in a letter that the demand for seats has continued at a steady increase ever since the fare reduction was announced, and that according to present indications there will be no change in this condition for some time.

Stout Air Lines has placed a local on their Detroit-Chicago line to serve the smaller communities along the route without interference with the regular run. The Aviation Corporation reported that in September

By  
Kent Sagendorph

its lines carried 5,150 paid passengers and flew 562,059 passenger-miles. Next month we will probably have the pleasure of recording even greater totals of miles flown with passengers, and many more persons added to the growing number of regular patrons of commercial air lines.

## "Pay As You Enter"

IT must be an annoying situation for airplane dealers, flight instructors, transport pilots and mechanics whose business requires them to be at an airport, and many of whom pay that airport thousands of dollars' rent every year, to be stopped at the gate by a man in a war-time uniform and charged a dollar for the privilege of going to work. As for the hundreds of other visitors who have legitimate business there and whose presence is required by various tenants of the airport, they had no choice but to pay the dollar or miss their appointments. For the man in the uniform at each gate in the high wall surrounding one of the best-known airports on Long Island accepted no explanations or recognized no passes. It was Armistice Day and the airport management had graciously given him the privilege of collecting tribute from all persons who sought to enter the field.

Not being personally acquainted with those who applied for admission, he did not know which ones were business men and pilots and which ones were thrill-hunting sightseers. So he collected impartially from all of them. Many were the harsh words which turned the brown November air blue as tenants were thus subjected to thoughtless extortion.

The airport management, by contributing this gate receipt to the patriotic organization, lost a few dollars which would otherwise

have been collected from the regular tourist trade. And they lost several thousand dollars' worth of good-will. If it appears necessary or desirable to turn over the portals to some society or other, at least provide an airport official to separate the sheep from the goats and see that those persons who come there on business are not held up.

## AIRPORT AND AIRWAY DEVELOPMENTS

Department Publishes New  
Airport Bulletins

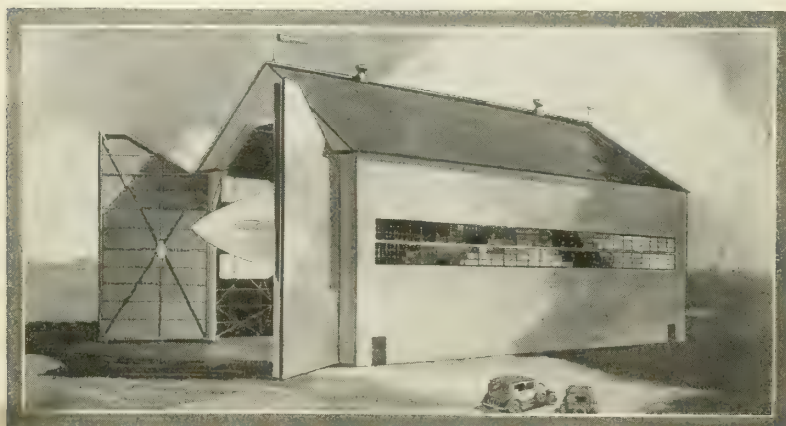
FOLLOWING is a list of new and revised airport bulletins which have been issued lately by the Aeronautics Branch, Department of Commerce, up to and including November 15, 1929:

Revised	No.
Airport	No.
New Orleans, Louisiana.....	16
Corning, California.....	106
Louisville, Kentucky.....	111
Los Angeles, Cal. (Aero Corp. Field).....	173
Spokane, Washington.....	179
Miles City, Montana.....	182
Oakland, California.....	197
Houston, Texas.....	264
Fort Huachuca, Arizona.....	268
Lakeland, Florida.....	272
Grayling, Michigan.....	292
San Diego, Cal. (Naval Air Station).....	297
Wallington, Connecticut.....	299
Hogiam, Washington.....	302
Nogales, Arizona.....	334
Midland, Texas.....	354
Yuma, Arizona.....	427
Newport, Vermont.....	428
Portland, Maine.....	451
Muscatine, Iowa.....	733
Lakeview, Oregon.....	734
Centralia, Washington.....	735
Portsmouth, Rhode Island.....	736
Moscow, Pennsylvania.....	739
Fairfax, Oklahoma.....	742
Anchorage, Alaska.....	743
Fort Yukon, Alaska.....	744
Bradenton, Florida.....	745
Bakersfield, California.....	746
Anniston, Alabama.....	747
Charlotte, North Carolina.....	748
Wanship, Utah.....	749
Washington, D. C. (Congressional Airport).....	750
Wabash, Indiana.....	751
Somerset, Pennsylvania.....	752
Butte, Montana.....	753
Crewe, Virginia.....	754
Rochester, New York.....	755
Chicago, Ill. (Westchester Airport).....	756
Pine Bluffs, Wyoming.....	757
Gothenburg, Nebraska.....	758

## Western Installs Costly Lights

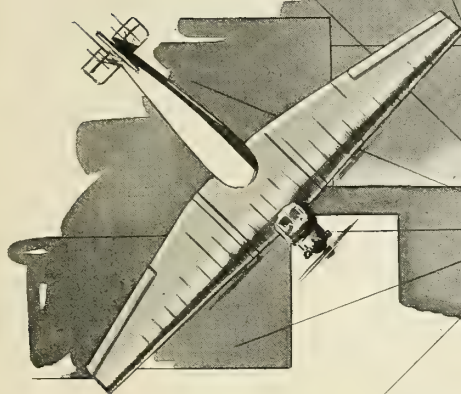
AFTER an expenditure of \$11,000 and three months of work, the flood and boundary lighting system perfected by West-

(Continued on next page)



Drawing of Goodyear-Zeppelin dirigible hangar recently completed at Gadsden, Ala.

# The Area of Year-Round Flying Climate



— and its geo-  
graphical and  
wealth center

**A**LL industry is trending southward.

Yet if there is one industry above all others which should establish its headquarters in the South, it is the aviation industry. This industry depends on climate as does no other; for its laboratory and its railroad are the sky.

The South, too, offers the aviation industry all of the other advantages which are attracting all types of industry southward—low housing, fuel and lighting costs both for the individual and for the factory—low clothing and food costs—better living conditions generally.

Tulsa is the logical headquarters city of the industrial South for many reasons. Located in the South's wealthiest state per capita—for Oklahoma is one of only 6 states in the nation producing over a billion dollars of raw materials annually—Tulsa is the wealth center of this great state. In one-third of the state's area immediately surrounding

Tulsa, is produced 59% of the state's natural wealth.

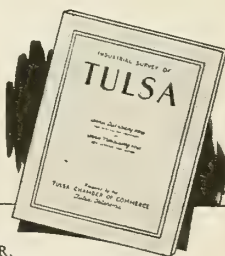
Again, Tulsa is the leading fuel production center of the entire world, lies at the heart of the nation's raw material resources, has the finest water imaginable in unlimited quantity, and offers every other industrial facility. Roger W. Babson recently characterized Oklahoma as one of the two Southern states destined for industrial leadership.

Finally Tulsa is at the center of the national market, is at the hub of the nation's skyways, and is headquarters of the oil industry, the largest single user of airplanes.

If you are interested in learning more about Tulsa we will gladly send you our new, comprehensive industrial survey. Inquiries held strictly confidential. Just attach the coupon to your letter-head and mail.

# TULSA

Hub of the Nation's Skyways



INDUSTRIAL  
COMMISSIONER,  
TULSA CHAMBER OF COMMERCE,  
Dept. A., TULSA, OKLA.

Please send me without obligation your new industrial survey of Tulsa.

Name.....

Company.....

Street.....

City.....





Testing new radio devices in the cabin of the Bell Telephone Laboratory's Ford trimotor

(Continued from preceding page)

ern Air Express on its million-dollar terminal on Valley boulevard in Los Angeles is practically completed, according to an announcement by C. E. Nikirk, chief electrical engineer of the line.

One of the largest items of expense was the arc light which, throwing a beam of 50,000,000 candlepower, bathes the huge field in radiance similar to daylight. It cost \$5,000. Lenses for the beacon were made in France.

#### Pilot Radio Firm Acquires Flying Laboratory

EQUIPPED for use as a flying radio laboratory and broadcasting studio, a Stinson monoplane powered with a Wright Whirlwind 300 engine has been purchased by the Pilot Radio and Tube Corporation of Brooklyn, N. Y. The cabin has been fitted with experimental apparatus for the development of radio altimeters and aircraft radio equipment and a transmitter for broadcasting purposes.

#### New Airport for Wilmington, Delaware

THE city of Wilmington, Del., is considering the purchase of 500 acres of land on the Delaware River just south of Pigeon Point, for the purpose of establishing a municipal airport. The option on the land has already been taken by several public spirited citizens, it has been learned. The mayor and city council have been working quietly for several months with a view to acquiring this river site, and have rejected another site just south of the Marine Terminal on account of the prohibitive price. Further action toward buying the land will be taken within the next two weeks.

It appears to this reviewer that the much-talked-of contract recently signed by the Bellanca Aircraft Corp. and the Wilmington Chamber of Commerce whereby the Bellanca airport became the Wilmington municipal airport was one of those famous scraps of paper, although at the time it was signed its terms specified that the airport was to be known as the Municipal Airport and was to run five years. The mayor's quiet campaign to build a distinctive municipal airport would indicate that something had gone wrong

with the original agreement, for traffic on Bellanca airport has never been much of a problem and there is ample accommodation for the normal volume of Wilmington Air Traffic.

#### Map of Hudson and Mohawk Valleys

FOR the use of aviators, the New York Power & Light Corporation has prepared a map for distribution, detailing towers and heights of wires at 22 crossings along the Hudson and Mohawk rivers between Hudson and Utica.

These maps are to be submitted to the Department of Commerce for incorporation in the government maps, showing airways between Albany and Buffalo and Albany and New York. Territory 15 miles on each side of the airway is included. All electric transmission lines and all gas and electric structures of more than 50 feet in height are shown on the maps.

#### Murfreesboro, Tenn., Installs Lights

CONTRACT for lighting equipment for the "Sky Harbor" airport at Murfreesboro, Tenn., owned and operated by Interstate Airlines, has been awarded recently to the Graybar Electric Company, according to a recent announcement.

Every type of standard airport light will be installed, including standard floodlights, boundary, obstruction and ceiling lights, rotating beacon and a special 24 K.W. floodlight.

#### Philly Anxious for New Airport

PHILADELPHIA has aroused from a civic nightmare in which the air maps of the country accorded no recognition to the Quaker City, third largest in the country. The city began recently with some show of earnestness, its efforts to establish a first-class municipal airport and regain a portion of its dwindling prestige.

The transfer of the government air mail base to Camden airport, across the river in the alien state of Jersey, has not been regarded with pleasure by citizens of the Pennsylvania metropolis. That action, preceded by some caustic statements from Washington which carefully avoided any complimentary reference to the condition of the old Philadelphia airport in the southwest district, was

a severe blow to civic pride. The situation was made worse a few days ago when Chester A. Charles, chief inspector for the Department of Commerce, Aeronautics Branch, packed up and moved over to the air mail base at Camden.

#### Consolidated Opens New Airport

CONSOLIDATED AIRCRAFT CORPORATION, Buffalo, N. Y., recently opened a private airport at Tonawanda, N. Y., a short distance from the company's Buffalo plant. The field contains two sections of ground—one of 126 acres and one of 20 acres.

The larger field has been drained and levelled under the supervision of the Industrial Planning Corporation of Buffalo. It contains a 3,000-foot slag runway with turns at either end and in the center. A 3,000-foot runway has also been constructed and has a dirt finish at the present time, although surfacing will be provided in the near future. Roads for vehicles have been provided, and construction of hangars will be started as soon as possible. The field will be used as a testing ground for land planes manufactured by the Consolidated group as well as a special field for owners of these ships.

The new airport is located 20 minutes by motor from Buffalo's business center, and two miles by road from the Consolidated plant. The property adjoins the tracks of the New York Central railroad.

#### Curtiss Airport Opens at Chicago

CHICAGO'S \$3,000,000 air terminal, the newest and largest in the Chicago district, was formally dedicated October 23rd, at Glenview, a suburb of the Windy City. Thirty-five thousand persons jammed into the grandstands and overflowed into the roadways and nearby fields to gaze into the sky at the opening festivities.

While the details of the new airport have not been disclosed, the size of the inauguration crowds indicated that an event of more than ordinary proportions was in progress. The Ford Reliability Tour competitors, led by Capt. Frank Hawks, arrived at the field and landed during the course of the afternoon.

Included in the program of events was a flight by a 1911 Curtiss three-wheeled pusher, flown by Dan Kiser, manager of the Curtiss flying activities, a flight by the Travel Air low-wing racer in which Doug Davis established a record at the Cleveland show, and a plurality of parachute jumpers, seven in number, who nonchalantly hopped out of the oval door of a Ford transport.

#### Del-Mar-Va Airport Has Swimming Pool

IN connection with the building program at Del-Mar-Va Airport, Hebron, Md., the contract was awarded this week for pouring of concrete in the construction of a swimming pool 75 by 35 feet, 11 feet deep and considered one of the finest in the country. The pool is to have a natural drainage system from the bottom. Water will be supplied by four deep wells near the pool and carried by an electric pumping system. The pool is

(Continued on next page)

Lt. J. H. Doolittle of the Daniel Guggenheim Fund for the Promotion of Aeronautics shown with his famous fog-flying plane.



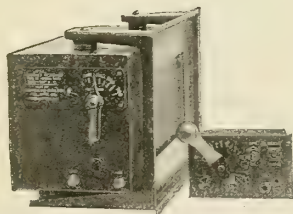
## Countless Fog Tests Have Strengthened His Confidence in Stromberg-Carlson Radio!

**L**IEUTENANT J. H. DOOLITTLE, of the Daniel Guggenheim Fund for the Promotion of Aeronautics, has run the full gamut of experience with fogs. And he knows, as much as anyone else, how great are the *safety* and *dependability* factors offered in Stromberg-Carlson Aircraft Radio Receivers.

Throughout innumerable fog flying experiments, sponsored by the Guggenheim Fund, Lieutenant Doolittle has relied upon Stromberg-Carlson Radio. In his recent remarkable achievement of taking off, flying a predetermined course and landing blind he was guided by radio beacon signals received on his Stromberg-Carlson Model "B" Receiver.

Lieutenant Doolittle is no "fair weather" pilot. Radio equipment he uses for fast flying and safe landings, may be depended upon by manufacturers and air transport operators to give maximum performance at minimum cost. Inquiries will receive our prompt attention.

STROMBERG-CARLSON TELEPHONE MFG. COMPANY  
ROCHESTER, N. Y.



Stromberg-Carlson Aircraft Receivers are licensed under A. T. and T. Co., R. C. A., R. F. L. and Aircraft Radio Corporation patents.

Stromberg-Carlson is the pioneer builder of Aircraft Receivers with rigid antenna, used on all mail planes.

# Stromberg-Carlson

MAKERS OF VOICE TRANSMISSION AND VOICE RECEPTION APPARATUS FOR MORE THAN THIRTY-FIVE YEARS



(Continued from preceding page)

to be surrounded by a concrete border, grass, and a picket fence. The work is expected to be completed within the next thirty days.

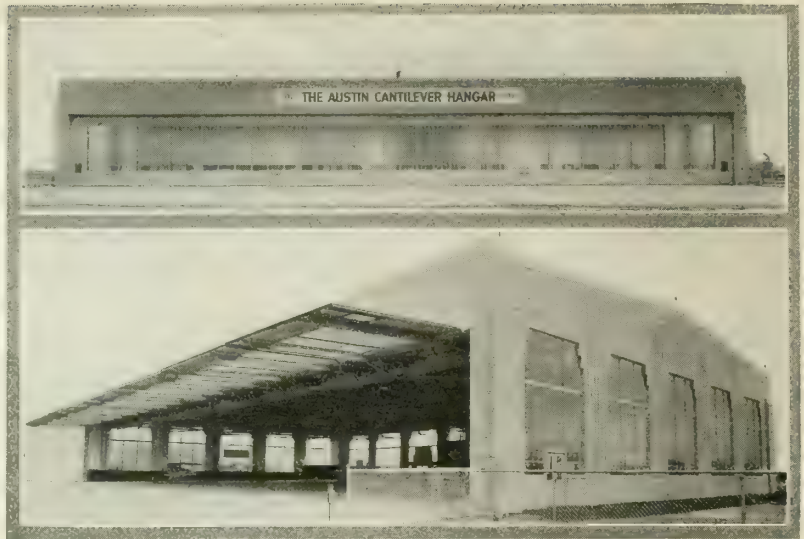
#### Austin Hangar First of New Type

THE Austin hangar at the Cleveland Airport, the first of a chain of such hangars which are to be erected by the Austin Co. in airports throughout the country for lease to transport operators, embodies the latest developments in hangar engineering. It is the only hangar now in operation which combines cantilever roof construction with cantilever door operation.

The cost of the hangar was placed at \$125,000, and it is the largest at the Cleveland Airport. The Ford hangar at Dearborn is the only hangar of cantilever construction which exceeds it in size.

The structure is 120 feet deep with a 200-foot clear door opening facing the field, and has a 20-foot clearance under the truss. The 24,000 square feet of floor area is clear, except for one column in the center, where two sections of the 200-foot carrying truss meet. The floor area would accommodate a ship of 190-foot wing spread, which is three or four times as great as that of the average ship now in operation. During the National Air Races it easily stored some 30 planes with a total wing spread of 1,450 feet. Six of these were Ford and Fokker transports.

The cantilever doors are in eight sections, each 25 feet wide and 21 feet 7 inches high. Each section can be operated separately, or



Exterior views of the recently constructed Austin hangar at the Cleveland Municipal Airport, which incorporates new elements of hangar design

all simultaneously, by means of electric motors which open the entire door in 50 seconds.

#### Distribution Planned for Strip Maps

PLANS are under way to make airway strip maps available at most of the large airports of the country, stated Clarence M. Young, Assistant Secretary of Commerce for Aeronautics, recently. In addition, Mr. Young's plans call for the maps to be ob-

tainable at the offices of clubs affiliated with the American Automobile Association and at various chapters of the National Aeronautical Association. The maps will be sent out by the Coast and Geodetic Survey. Aviation charts of the Hydrographic office of the Navy Department are now available at 48 cities.

### REGULATING AIR TRAVEL

#### Urge Delay in Federal Regulation

"AIR transportation cannot yet be intelligently regulated, but there is no doubt that in the future some Governmental regulation in fixing rates and schedules will be necessary," stated Assistant Secretary of Commerce for Aeronautics Clarence M. Young recently.

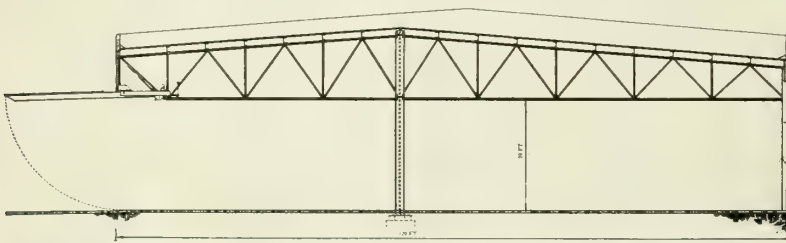
"Operators," says Mr. Young, "have not had sufficient experience to settle definitely on rates and costs. Discrepancies exist at present over some routes, but that does not mean that they will exist permanently over all routes. If any effort is made to begin immediate regulation of air traffic it will be premature and will not help the cause of air transportation.

"However," continued Mr. Young, "air transportation operators agree with me that some kind of regulation is scheduled for the future when the companies are well under way in the matter of air routes, operating costs and other matters. An agency which attempts such regulation must be specially fitted for that work, as it differs greatly from problems which are arising in the industry today."

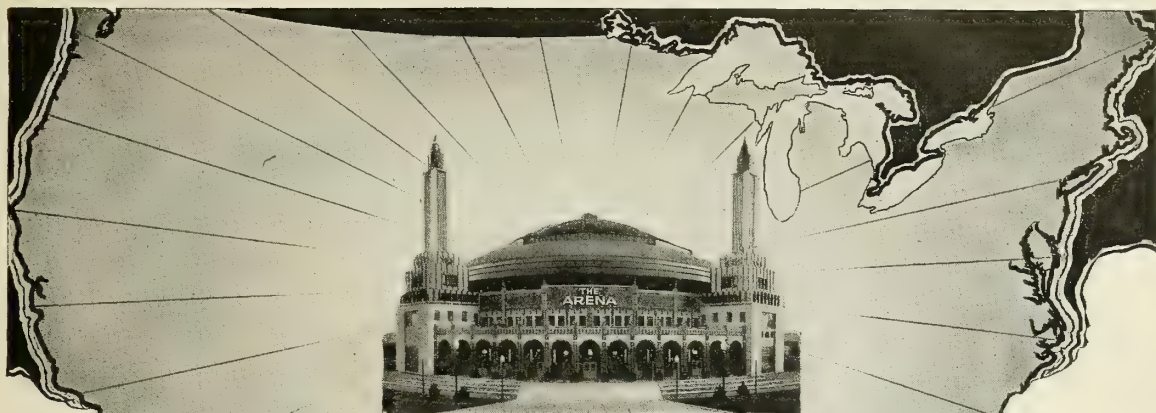
#### Ask Support for Airport Law

A RESOLUTION was recently adopted by the municipal airport conference in Washington urging that city officials actively support the movement for better equipped and constructed municipal airports. They were also asked to urge the passage by State

(Continued on next page)



Interior of new Austin hangar at Cleveland, and, above, drawing showing structure of cantilever roof and doors



## America's Central Showplace

presents — February 15<sup>th</sup> to 23<sup>d</sup> —

# The International Aircraft Exposition

As the most central and accessible Aviation City in the whole United States, St. Louis offers, with its huge Arena, unequalled facilities for the one officially-sponsored International Aircraft Show to be held during 1930.

Serving this natural center of Aviation is half the total railway mileage of the nation. Fast, direct transportation is offered to and from every section of the country. Nearer than to any other large city is the national center of population.

Unlimited hotel accommodations are here. Here, too, are four famous flying fields; five aviation schools; four airplane manufacturers; an engine factory; a great transcontinental airway headquarters; and scores of allied and subsidiary manufacturers. St. Louis presents, in itself, a lively picture of vital interest to every one concerned with Aviation.

The new St. Louis Arena, just completed, is the largest permanent show place in

the world. Its main structure seats 21,000 people. Flanking this are two huge exhibit buildings, each containing more than 86,000 square feet of floor space. Through their doors, planes are wheeled directly in from the adjacent landing field without dismantling.

Convenient spur tracks are on the grounds. The buildings face a main boulevard. The Arena is close to the center of the city. Union Station is only 24-minutes' streetcar ride distant. Cars and busses pass the door. Parking space for thousands of cars is provided.

Here, during February next, will be held the greatest Aeronautical Exposition ever undertaken. Everything new in Aviation, the latest developments from Europe and America, will be gathered here. Plan to be in St. Louis, without fail, during the third week of February!

THE INDUSTRIAL CLUB OF ST. LOUIS  
511 Locust Street • • • St. Louis, Mo.



Detailed information relative to the International Aircraft Exposition can be had by addressing the Aeronautical Chamber of Commerce, 10 E 40th St., New York City.

# ST. LOUIS

CENTRAL MANUFACTURING CITY OF AMERICA



(Continued from preceding page)

governments of the model airport law drafted by the Department of Commerce.

The conference was held under the auspices of the city official division of the American Road Builders' Association and sponsored by the Aeronautical Chamber of Commerce. About 300 attended, it was stated.

#### Department Issues Air-Marking Bulletin

THE system of air marking that will convey the necessary information to airplane pilots, which has been lately recommended by the government, has been described in detail in a new aeronautics bulletin entitled "Air Marking," which is now ready for distribution by the Aeronautics Branch.

The bulletin is profusely illustrated, and covers comprehensively the general requirements for air marking, color combinations, size and style of lettering, location of markings and their construction, illumination of markings, route marking and highway marking.

In general, the bulletin suggests that the markings should be as simple as possible consistent with the information to be conveyed; of such size and color as to assure maximum attractive power under all atmospheric conditions, easily legible from an average altitude of flight, and so illuminated that they are equally effective day and night. Moreover, they should be of a permanent nature, economical to construct and maintain and placed in accordance with a fairly definite system in order that pilots may know where to expect them.

#### Chamber of Commerce Offers Legal and Traffic Aids

EXTENSIVE plans for aiding the air transport lines in the development of traffic, and counselling and assisting the management of the Chamber in legal and legislative problems will be carried out by the organization, following the recent adoption of a program of activities for the Chamber.

The development of traffic was recognized as the foundation of the development of commercial aviation by the transport operators who attended the Washington meeting. They discussed the necessity for concentrating their efforts in one central organization, representing all phases of the aircraft industry, and appointed a committee to consider ways and means in which this objective could be attained.

The Board of Governors appointed a legislative committee to assist it with legal and

legislative matters, consisting of Mrs. Mabel Walker Willebrandt, Allen J. Furlow and George S. Wheat. This committee has already made a report to the Board of Governors favoring certain legislative reforms.

#### THE PASSENGER LINES

##### Pickwick Earnings Exceed 1928 Total

EARNINGS of the Pickwick Corporation and subsidiaries for the current year will exceed those of 1928 by a substantial margin, it was declared recently by Charles F. Wren, president. Indication of the prosperous condition of the Pickwick corporation and its subsidiaries is seen in Mr. Wren's statement that the entire dividend requirements for the year on common stock, amounting to 80 cents, was earned during the first seven months of this year.

The company's Mexican airline, known as the Pickwick-Latin America Airways, is also in a flourishing condition, it was learned. The service was inaugurated with a fleet of eight cabin planes, and volume of business has made it necessary to increase the number to eleven, within two months of the beginning of the service. In addition, the company's line has been extended between Guatemala City and San Salvador, adding 112 miles to the 2,400-mile air line and providing Salvador with much-needed facilities for more rapid transportation.

Travel on the Pickwick line from Los Angeles to San Diego gained approximately 12 per cent in October over the previous month.

##### W. A. E. Orders Six New-Type Planes

SIX new-type mail and passenger planes have been purchased by Western Air Express for its Los Angeles-Salt Lake run, according to C. W. H. Smith, general traffic manager. The planes are known as Fokker F-14's, with a total pay load of 1,600 pounds. The cabin will accommodate six passengers.

##### Another 100% Interstate Record

FOR seventeen weeks during the summer and fall the Interstate Airlines operating between Atlanta, St. Louis via Evansville, Ind., and Chicago, operated at 100 per cent schedule efficiency. In view of the varying weather conditions that are encountered over this route, and in view of the particular period involved, this record is unusual, says Col. W. G. Schauffler, Jr., vice-president and general manager.

New and larger equipment is being provided. Night flying over the route will begin December 1st, using Stearman Light Transports, accommodating four passengers in a cabin and 500 pounds of mail in a large

compartment immediately ahead of the passengers. The shippers will be powered with Pratt & Whitney Hornets of 525 h. p., and will have provision for radio apparatus.

##### Maddux Develops Side-Line Business

MADDUX AIR LINES, INC., Los Angeles, Cal., has discovered that certain forms of air transport business formerly thought unprofitable may, if properly developed, prove to be sources of considerable revenue.

Charters are one of the foremost features of this additional business, aside from the company's regular transport runs. A four-passenger Lockheed is available for cases requiring extreme speed, and there are, in addition, a two-place open Stearman and occasionally one of the company's twelve trimotored Fords. The Governor of Lower California has his headquarters at Mexicali, and he finds the charter planes of great service in business connected with the state. The motion picture people in Hollywood often charter planes for trips to the Mexican resort and for transportation of personnel and supplies on location work. Hostesses have been known to charter a trimotored Ford for bridge parties and fashionable teas.

The biggest feature of this side-line business is the sight-seeing run made by one of the Fords on Saturdays, Saturday evenings and Sundays. The trips are well advertised, and serve to entice many persons into an airplane for the first time, introducing them to the joys of air travel and providing possible future customers for the scheduled transport runs.

One of the largest department stores in Los Angeles chartered one of the Wasp-powered ships to provide short rides over the city to all its employees, two-thirds of whom had never been in the air.

##### Huge Aviation Corp. Passenger Total

THE Aviation Corporation's fleet of 300 planes flew 562,059 passenger-miles on its 10,000-mile air transport system in September; carried 5,150 paid passengers, transported 104,606 pounds of air mail and maintained 96 per cent schedule efficiency, according to figures made public by Tom Hardin, newly appointed Director of Transportation.

These statistics show the several subsidiaries of the gigantic group are operating at larger scales this year than last year, each line showing appreciable gains over the corresponding period in 1928.

##### Pacific Coast Leads in Passenger Traffic

A SURVEY of air transportation conditions indicates that more persons travel by air, per capita, along the Pacific Coast than in any other section of the country, and according to many who know traffic conditions intimately, between 30 and 35 per cent of the traveling public uses the airplane either regularly or occasionally.

The companies which operate in the Pacific territory report that the demand is less seasonal in the air than it is with the steamship lines, and reflects a condition more nearly approaching the railroads. All lines

(Continued on next page)



Air marker, with letters 71 feet high, on the Union Pacific stockyards roofs, Marysville, Kansas

## An Opportunity to Secure A Sales Franchise for CURTISS-WRIGHT Aviation Products

The Curtiss-Wright Corporation invites applications from aeronautical and automotive dealer organizations for appointment as sales agents for AIRPLANES produced by the Corporation and the following subsidiary companies:

TRAVEL AIR COMPANY  
MOTH AIRCRAFT CORPORATION  
CURTISS-ROBERTSON AIRPLANE MANUFACTURING COMPANY  
LOENING AERONAUTICAL ENGINEERING CORPORATION  
CURTISS AEROPLANE & MOTOR COMPANY  
KEYSTONE AIRCRAFT CORPORATION

By reason of the prominent standing of the Curtiss-Wright Group, second to none in the industry in engineering, manufacturing and financial resources, the desirability of these sales franchises will be fully recognized. They afford an opportunity to high class sales and distributing organizations, especially those with aeronautical or automotive experience, to engage in the sale of aviation products under the most favorable circumstances.

The market for Curtiss-Wright products is firmly established, with annual sales amounting to many millions of dollars. Curtiss-Wright service organizations cover the country and will be a bulwark of strength to the local sales organizations. An advertising program of greatly increased scope and other means of effective promotion now under way will insure continued progress in Curtiss-Wright sales during the coming year.

Address inquiries to

DEPARTMENT 1-F, SALES DIVISION  
**CURTISS-WRIGHT CORPORATION**  
27 WEST 57TH STREET, NEW YORK



(Continued from preceding page)

report a steady increase in every regular run, and it seems only a matter of a short time before new equipment must be added to that already available. Increase in traffic has resulted in two or three fare reductions, which have been noted in these pages, and these reductions are largely responsible for the augmented passenger lists of the companies which offered them.

#### Service Ribbons for Universal Pilots

**P**ASSENGER flying on the lines of the Universal Aviation Corporation will be able to tell the length of service of each pilot on the company's ships by means of service ribbons, it was announced by Paul Goldsborough, vice president in charge of operations. The pilots will wear the ribbons beneath their insignia on their coat. The ribbons are of two and three colors and will be issued to the pilots at six-month, twelve-month, twenty-four and thirty-six-month intervals.

#### T. A. T. Offers Air-Water-Rail Tour

**T**RANSCONTINENTAL AIR TRANSPORT, INC., which is already affiliated with the Pennsylvania Railroad, has added a steamship company to its hook-up, according to an announcement by T. B. Clement, general traffic manager of T. A. T.

The marine addition to the combination is the Panama-Pacific Line, operating a fleet of huge liners between New York and the Pacific Coast via Panama Canal. The new service will include a special tourist ship which is referred to by company officials as the "Over and Around America by Air, Land and Water" tour.

The trip may originate at any point on the route of the T. A. T. or its associated railroads, or at any city served by the Panama-Pacific line. After the air, water and rail circle, the traveler returns to his starting place. Time required for the complete circle, a distance of 9,000 miles, is sixteen days. Stop-overs may be arranged at any point.

The all-inclusive cost of the tour was announced at \$550. This includes plane fare, transportation to and from airports, meals in the air and at the T. A. T. passenger stations, rail and Pullman fares and steamship fare, meals and berth. The service was inaugurated November 2nd with the sailing of the *SS. California*.

#### Business Good on S. A. T. Lines

**D**URING the first six months of operation the three passenger lines of the Southern Air Transport, Inc., transported 3,400

passengers 724,475 miles, states Victor F. Grima, general traffic manager of the Aviation Corporation subsidiary. According to Mr. Grima, passenger traffic has increased rapidly from month to month, and it is expected that it will continue to increase for some time. So far there has been no indication of a let-up. Ever since August 1st, when the fare was reduced, there has been a sharp increase in patronage.

S. A. T. ships have flown two million miles carrying mail, express and passengers, and trained a large number of students, all without accident.

#### Rio Line Starts Preliminary Operation

**T**HREE new airlines of the New York, Rio and Buenos Aires Line fleet for South American division of the international flight to Buenos Aires, where they are scheduled to go into immediate service on the South American division of the international air transport route. The last member of the squadron, piloted by K. C. Hawkins and Bertram Sours, left Roosevelt Field a few days ago for Tampa, where it will be christened *Tampa* at the company's base there.

The three planes are all Wasp-powered Sikorsky amphibians, and are the first of a fleet of 21 seaplanes which the line will operate.

#### 10,000 Passengers in 11 Weeks

**M**ORE than 10,000 trip tickets have been sold over the Seattle-Bremerton air-ferry, established at Seattle.

Capacity loads have been carried by the two planes on the service ever since its inauguration eleven weeks ago. Expansion providing for more planes and a similar service to the various Puget Sound island cities from Seattle, to begin next summer, has been announced by Vern Gorst, head of the Gorst Air Transport, which operates the system.

#### New Line from Dallas to Los Angeles

**G**RAT SOUTHERN AIRWAYS, INC., has begun a daily airline service between Dallas and Los Angeles. This will eventually result in a twenty-four-hour service between New York and Los Angeles, company officials predict.

Single-engined, all-metal monoplanes with a cruising speed of 130 miles per hour will be used. The actual time between Dallas and Los Angeles will be ten hours and thirty minutes.

#### Frenzied Fans Fly to Football Fields

**O**LD grads whose cars are marooned in traffic snarls are taking to the air in huge numbers, according to a communication

recently received from Oakland, Cal. In some cases on the Pacific Coast, men desiring to attend a certain game have pooled their interests and chartered a number of trimotored transport planes. In another case there is a well-established campus bureau which reports that seats on all its chartered planes were sold out weeks in advance, and that there were no cancellations. Ten planes were required to transport the University of Nevada squad to Los Angeles to battle with the U. S. C. "Trojans," and the University of New Mexico team also traveled by airplane to its game with the same outfit.

At the recent game between Stanford and the University of Southern California at Stanford stadium, more than 90 airplanes arrived before 1:30 p. m. and 85 remained parked on an adjoining field. Others arrived but did not register, owing to the strain upon the boys who dashed about among the arriving planes with the airport book to sign. Many aircraft which were thus unreported were Army planes from Crissy Field, San Francisco, as well as numerous private aircraft. Records of 400 paid passengers were prepared from those among the registered planes which landed at the airport. Maddux and Western Air Express ran special Football Sections and charter planes from nearby points on the bay, bringing full loads. Overland Air Service had capacity loads from Mills Field, San Francisco, and other smaller operators brought in a number of unrecorded passengers.

Western Air Express had three of its traffic managers on the field to help keep order among the newly-arrived fans, and answer as many questions as possible. Many did not know what plane they had flown there in. Others did not know which pilot had brought them to the field. The Standard Oil Company of California had a special emergency crew which was kept busy dashing about the field with gasoline and supplies. Eighty-five planes took off from the field, including 12 trimotored transports, between 5:15 and 6:00 p. m., without accident.

#### AIR MAIL ACTIVITIES

##### Low Rate Proposed for Transcontinental Mail

**S**OUTHERN SKYLINES, INC., of which William Gibbs McAdoo is chairman, has proposed a new transcontinental air mail route from Washington, D. C., to Los Angeles, it was announced recently at Washington. The company agrees to carry all first-class mail on the line for 60 cents per thousand miles and 6 cents for

(Continued on next page)



Facilities at Oakland Municipal Airport: right to left, 37-room inn, 250-seat restaurant, administration building, and five all-metal hangars

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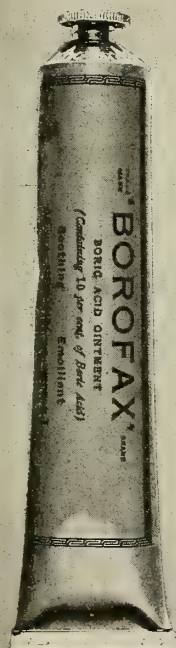


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(HANDY APPLICATOR)

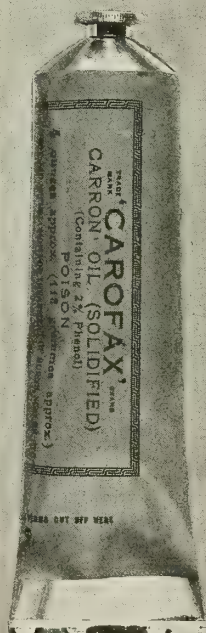
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(Continued from preceding page)  
each additional hundred miles. The proposal was turned over to W. Irving Glover, assistant postmaster general, to determine the practicability of such a course. Old-timers among air-mail contractors noted that the proposed rate is considerably under that which the Boeing Air Transport Co. now receives for the portion of the route between Salt Lake City and San Francisco, which rate is understood to be \$1.50 per thousand miles and 15 cents for each additional hundred miles.

#### More Weather Observers for Mail Lines

THE weather bureau has recently established airway weather observers along the three new mail routes from Portland, Ore., to Pasco, Wash., Pasco to Spokane and Omaha to St. Louis. Observers placed at the intermediate points along these lines will supply weather reports to the pilots upon call from the terminal stations. Surveys are being made to extend the service to other lines, among them being the New York to Boston and Salt Lake to Pasco routes.

#### New Mail Line Across South Asked

SEVERAL representatives of civic bodies, Chambers of Commerce, boards of trade and other commercial organizations are in Washington to urge a new air mail route from Los Angeles to the East by way of the Southern section of the country. Rep. Swing (Rep.) of El Centro, Cal., is leading the fight for the new airway, which, he believes, should pass over Los Angeles, San Diego, Phoenix, Tucson, Fort Worth, Dallas, and thence either via St. Louis or Atlanta with a possible alternate route via El Paso, Houston and New Orleans.

#### Panama Government Loses on Air Mail

THE Panamanian Government has announced that the rates charged them for transportation of mail by the only operating company now in Panama, the Pan-American Airways, Inc., does not leave a margin of profit for the postoffice. On the contrary, mourns the Panamanian postmaster-general, the country loses heavily on all mail except that forwarded to the United States and other parts of the Republic, which latter class does not travel in Pan-American airplanes.

#### Colonial Western October Record

COLONIAL WESTERN AIRWAYS, operating between Albany and Toronto, established a new record for their traffic in October, when 12,557 pounds of mail were carried. This is a daily average of 465 pounds.

A report has also been current that the Colonial Air Transport has ordered five ice-warning indicators for the use of its night-flying planes on C. A. M. No. 1, the Boston-New York route. These instruments, manufactured by the Moto-Meter Gauge and Equipment Corporation of Long Island City, New York, are installed on the struts of the planes and connected to a dial in the cockpit, which serves to warn the pilot of the dangerous air strata in which ice may form on the wings of the craft and force it down.

Colonial Air Transport carried 576 passengers from New York to Boston, or vice versa, during October; 9,566 pounds of mail also made the journey in the planes of the same company.

#### Study Methods for Speeding Mail Delivery

EARL WADSWORTH, superintendent of the air mail service, stated recently in Washington that the Post Office Department was doing everything possible to expedite delivery of air mail to the cities after its arrival at the airport. Among the possibilities being considered are pneumatic tubes between airport and postoffice and mail-catching devices on the roof of the postoffice.

#### Eight Contracts Expire: Bids Asked

POSTMASTER-GENERAL WALTER F. BROWN added another coup to his campaign to reduce the payments made to air mail contractors on October 7th, when eight air-mail contracts expired. Under the law, he is empowered to extend the life of the contract provided the contractors agree to a rate of pay fixed by the government.

Consequently, bids will probably be asked for successors to the present contractors, it was announced. The Postmaster-General warned present contractors that an agreement must be reached within a very few days, but contractors were reported as having difficulty in adopting a scale of payment satisfactory to the Postmaster-General.

#### Hoover Interested in Air Mail Rates

THE White House, Washington, October 15th.—President Hoover has instituted an exhaustive inquiry into air-mail routes and rates as a part of the administration program for reorganizing the air-mail service on a more stable rate structure.

The inquiry is directed first to finding a formula for a universal rate structure for air-mail service, and secondly to coordinate the efforts of the branches of government interested in aviation. The study grew out of the President's quest for ways and means of reducing the Postoffice Department deficit.

#### Air Express Traffic Increases

INCREASED use of air express service has resulted in the transportation of about 5,845,000 pounds of merchandise within the last three years, Harry H. Blee, chief of the Division of Airports and Aeronautic Information, announced recently. Col. Blee's statement summarized the classes of merchandise now transported by air express and made recommendations concerning the development of the traffic in the future.

#### New Canadian Air Mail Lines

TWO new air mail lines were recently inaugurated in Canada, according to an official communique from the Postmaster-General of Canada. The two lines are:

Winnipeg to Calgary, via Regina, Moose Jaw and Medicine Hat.

Regina and Edmonton, via Saskatoon and North Battleford.

No technical information concerning the type of airplane used or the schedules offered is available.

## NEW COMPANIES AND MERGERS

### Memphis Aviation Concerns in Merger

CONSOLIDATION of the Valley Air Lines, Inc., and the Tri-State Airways, Inc., under the name of the Southern Aviation and Transport Corporation, has recently been announced at Memphis, Tenn. The combined company will continue to operate all fields and equipment now owned by the two companies.

### Two International Lines Consolidate

THE Arrowhead International Airlines, operating between Duluth, Minn., and Port Arthur, Canada, has been combined with the Canadian-American Airlines, Inc., of Minneapolis-St. Paul, under the name of the latter company. William S. Brock, vice-president of the Schlee-Brock Aircraft Corporation of Detroit, is president of the combined lines.

A new field has been added to the holdings of the combined company at Minneapolis, 15 minutes from the center of the city and directly north. It lies along the West River road and is of ample size for use as a passenger terminal and a school, which is contemplated.

The consolidation of the two international lines and the purchase of the field are steps in the expansion of the Schlee-Brock Corporation, which plans wide development of all its facilities in the near future.

### New Feeder Line Between Wichita and Omaha

EXPERIMENTAL service has been in operation for several weeks on a new feeder line for the transcontinental and mid-continental air routes, to operate between Wichita, Kan., and Omaha, Neb. The service is under the auspices of the Brower's Air Service Corporation of Lindsborg, Kan.

One plane will operate daily in both directions between Wichita, Salina and Belleville, Kansas and Omaha. Challenger Robins are being used on the line.

### Hawaii Starts Inter-Island Service

ARMISTICE DAY, Nov. 11, saw the beginning of airplane service between the islands of the Hawaiian group, according to an announcement by Inter-Island Airways, Inc., which has assembled a fleet of bi-motored amphibians to care for the demands of traffic.

The Navy assisted in the dedication ceremonies at the John Rodgers Airport, from whence the first planes took off. The presence of Governor Judd and other dignitaries made the event a gala celebration.

The project is sponsored by the same group of men who direct the Inter-Island Steam Navigation Co., which has maintained an efficient schedule between the various points for many years. Over-night trips between Honolulu and Hilo, near the famous volcano, may now be made in a couple of hours. Business communications will be

(Continued on next page)

# PROOF

Words, ads, sales talk—these do not convince. In the final analysis, it is PERFORMANCE that clinches the sale. <sup>a</sup> When Stromberg sets out to convince you of its merits, it needs no greater proof than the achievements listed below.

## *Stromberg Carburetors Used in Creating Every Record Shown Here*

Endurance Flying Record—"St. Louis Robin"—Dale Jackson, Forest O'Brine  
—in the air over 420 hours..... 1929

Cross Country Flight—Los Angeles to Roosevelt Field, L. I., Frank Hawks  
in Lockheed Vega plane—18 hrs. 21 min, 59 sec..... 1929

Flight to North Pole—Capt. G. H. Wilkins 1928

Washington, D. C. to Mexico City—Col. Chas. A. Lindbergh..... 1928

Oakland, California, to Australia—3 hops—Capt. Kingsford-Smith..... 1928

Trepassy, N. F., to Wales, England—Amelia Earhart, Wilmer Stultz, Louis Gordon ..... 1928

New York to Paris in his now famous "Spirit of St. Louis"—Col. Chas. A. Lindbergh..... 1927

New York to Berlin and previously an endurance record—Clarence Chamberlin ..... 1927

New York to France—Com. R. E. Byrd.. 1927

Winner of Dole Flight—Oakland, California to Honolulu—Art Goebel, Lt. Davis ..... 1927

Flight to North Pole—Com. R. E. Byrd 1926

All Three Winners Reliability Tour—  
1st, Travel Air, Walter Beech, Pilot—  
2nd, Buhl-Verville-Custer—  
3rd, Wright J-4, Stinson, Pilot..... 1926

STROMBERG MOTOR DEVICES CO., 58-68 E. 25TH ST., CHICAGO, ILL.



(Continued from preceding page)

greatly facilitated and the carrying of mail speeded up. Passengers will be carried, but it is expected that for the present the bulk of the traffic will continue on the company's steamers until such time as the officials desire to develop the passenger traffic.

## NEW DEVICES AND METHODS

### T.A.T. Develops New Radio Transmitter

**F**OR the past three months tests have been in progress over the lines of the Transcontinental Air Transport of a new type of radio transmitter for airplane use. The device has been developed by communications engineers of the company's communications section in cooperation with Mr. E. W. Proctor.

The longest test made provided clear communication between an airplane over the T. A. T. airport at Kingman and the T. A. T. radio station at Clovis, N. M., a distance of 617 miles. Its value for airplane use is enhanced by its small size and weight, which, including all controls and tubes, dynamotor, antenna and microphone is 87 pounds. A trailing wire type of antenna is employed.

### Boeing to Use Magneto Compass

**T**HE first application of the new General Electric magneto compass to commercial transport service will be made by the Boeing Air Transport passenger service between Chicago and the coast. Its main value is as a direction finder, and it can be de-



New cone-type boundary light developed by Curtiss Airports Corporation

pended upon to furnish accurate information concerning the plane's altitude and direction regardless of fog, snow or other weather hindrances. Sensitized pole-pieces produce the directional effect, eliminating the large revolving armature with many turns of wire which have been used in the past on other types of remote-indicating compasses.

### New-Type Boundary Light

**T**HE Curtiss Airports Corporation, affiliated with the Curtiss-Wright Flying Service, has developed a novel type of air-



port boundary light, the chief feature of which is the ability to overturn when struck by an airplane or other object without suffering damage. The device is simple in construction and is easily adjusted or inspected.

The light is supported by a cone which is held in place by its own weight. If struck, it overturns easily, disconnecting the wiring by pulling a plug through a flexible cable from a weather-proofed cut-out. Breaking the contact closes the circuit automatically without affecting the other lights on the same system.

## SACRAMENTO'S SECOND AIRPORT

By Howard V. Waldorf

**C**ITIES planning to establish a municipal airport should be interested in the method used by Sacramento, state capital of California, in selecting its second flying field. Sacramento first undertook to establish a municipal airport in 1926 when, on the advice of an itinerant commercial flier, a portion of the rolling 283-acre Del Paso Park was transformed into an airport at a cost of \$15,000. The airport was widely advertised, but the expected aerial rush to take advantage of the flying field failed to materialize. Fliers continued to land at the more remote Mather Field, military airport.

Investigation revealed that Sacramento's official airport was not suitable for commercial operations. A grove of historic trees practically surrounded the flying field. If the flier was lucky enough to surmount this obstacle, the rolling terrain of the flying field made the actual landing extremely difficult and hazardous. Moreover, the field was a quagmire in the winter. Although located on the transcontinental air mail route, it was not selected as a port of call, mainly because of these hazards.

A year ago the city fathers decided it was high time to start all over again and place Sacramento on the air map in a more scientific manner. Accordingly, it was voted

that an airport committee of nine members be appointed to select a site for a municipal airport and to outline a program of development. Roy St. Johns, engineer and a licensed flier, was appointed chairman of this committee.

To avoid a repetition of that first blind plunge into aviation, a scientific system of procedure was agreed upon at the first meeting. The first step was a thorough study of available information on the location and development of airports and the requirements for a Department of Commerce A-1-A rating. Then, keeping this first data in mind, the committee outlined specifications for an airport to meet the present and future needs of the city. Sacramento is a city of approximately 80,000 population.

It was agreed that the site should not contain less than 160 nor more than 640 acres, that it should be of sufficient area for four runways, each not less than 2,500 feet long by 500 feet wide, that it should be not more than eight miles from the postoffice, one mile from the railroad and near a main highway. These specifications were advertised in the daily newspapers.

While waiting for replies from landowners, the committee studied weather conditions. Since Sacramento is located in fairly level territory, the records of the downtown

weather bureau were accepted as standard for the entire area included in the survey. Weather reports for a twenty-year period were studied.

The question of fog was a serious one, for the city is located on the Sacramento and American Rivers. The weather bureau records showed that fog was most prevalent during December, January and February. It was decided to take daily observations during this period. Four stations equipped with instruments to record temperature and humidity, were set up. The stations, equidistantly located, covered the entire area under survey.

As these observations were completed, the committee received offers of eighteen sites. Six of these sites were immediately eliminated from consideration because of obvious hazards or failure to comply with the specifications.

The first step in the consideration of the remaining twelve was to gather data on each site as to the distance to the postoffice and to the center of population, the character of the territory, the area of the site, transportation facilities, and facilities for power, water, and sewage.

Next a sketch of each site was drawn, showing runways, lights, hangars and other facilities, necessary to comply with the Department of Commerce A-1-A rating.

Then came the question of the cost of development. This question was answered for

(Continued on next page)



## THE NEW 7-PLACE LOCKHEED VEGA

World's fastest commercial plane . .  
with lowest cost per passenger mile

For commercial purposes, the new Lockheed Vega offers airline owners a 7-place ship that is unquestionably the fastest and the most economical transport plane to operate. With a speed of 165 m. p. h. it cuts passenger-mile costs to the lowest—and earns a premium for passengers in time saved.

With Department of Commerce Approved Type Certificate Number 227, the new 7-place Lockheed Vega is licensed to carry 6 passengers or a useful load of 1775 pounds. Powered by the ever-reliable Wasp engine it is the most logical plane for fast commercial transportation.

*The new 7-place Lockheed Vega is listed at \$18,900.  
Complete information will gladly be sent upon request.*



LOCKHEED AIRCRAFT CORPORATION

DIVISION OF

DETROIT AIRCRAFT CORPORATION

Burbank, California

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(Continued from preceding page)

each of the twelve sites. A unit price for grading was established through estimates made on one site. This figure was used on all sites.

With this preliminary work completed, the way was paved for the most important question—the comparative desirability of each site. To determine this, a 100-point rating system was devised.

The system was as follows:

Freedom from fog (determined by observation) .....	15 points
Freedom from bad air currents (determined by actual flight tests) .....	10 points
Area of site .....	10 points

(An area of 250 acres was decided upon as the required size, and sites smaller and

larger were given reduced ratings in proportion.)

Shape of site .....	5 points
Approaches and surroundings.....	8 points
Favorable prevailing winds.....	5 points
Proposed neighborhood development .....	4 points
Possibility of expansion of area..	4 points
Accessibility to air travel .....	10 points
(Sites on the transcontinental airway were given full rating and others in proportion to distance away.)	
Distance from center of population.	10 points
Distance from railroad.....	4 points
Distance from postoffice.....	10 points
Distance from aircraft factory sites	5 points
Total .....	100 points

Then the cost of each site (the purchase price plus the estimated cost of development) was divided by its individual desirability rating. The result was the unit of

rating. The unit of rating was compiled for the twelve sites. This completed the scientific survey—after ten months of work.

A site of 235 acres, four miles from the postoffice, providing sufficient area for 4,400-foot and 3,000-foot cross runways, was selected as the committee recommendation to the city council. The price was \$80,000. The development brought this figure to \$650,000. This development program was to extend over a period of approximately ten years.

To eliminate the necessity of a bond issue, many of which have been turned down by the voters during the past few years, it was recommended that the site be purchased and developed through annual appropriations. The recommendations were accepted by the city council, and Sacramento is now busily engaged in developing its scientifically selected airport.

## CLOVER FIELD, SANTA MONICA

By Frank E. Samuels

CLOVER Field, which was the second municipal airport established in the State of California, has been the scene of notable aeronautical events and the birthplace of many worth while aviation industries. Only a few short years ago it was a bean field, afterward a dusty and rough flying field, but now it is one of the most up-to-date and best managed airports in the country.

The buildings on Clover Field consist of three trussless hangars, each 103 by 135 feet, with unobstructed storage space of 100 by 100 feet, and equipped with office and classrooms 17 by 85 feet and shop and spare parts rooms of the same size. Included in the buildings are dressing rooms for men and women, with hot and cold water showers, lavatories and toilets. The hangars each have a carrying beam for lifting motors and ships, with a capacity of 3,000 pounds, concentrated load. The doors are 80 by 16 feet. Concrete aprons laid between the hangars are 125 by 135 feet in size and are well drained.

Gasoline is supplied from pits adjacent to the runway. Compressed air and water are supplied at convenient locations. Public long distance and local telephones and U. S. weather data, checked hourly by phone, help to make up an excellent service.

The field has a runway into the prevailing wind 700 by 2,890 feet, oil-treated and practically dust-proof, with a one per cent slope. The lighting system consists of one Stone fog beacon, two illuminated wind cones, obstruction lights on telegraph poles at the east end of the field, boundary lights around the entire field, a bank of four floodlights and a complete lay-out of approach lights. On the north, and adjoining the field, is a 100-foot radio tower, illuminated and with two 3,000-watt beams, shooting straight up. Adjoining the field on the west is the fire-proof plant of the Douglas Aircraft Company. The field is under the jurisdiction of the Clover Field Association, with Lieut. Duff Willson, U.S.A. (retired), as airport manager.

One of the notable events that gave Clover Field much front page publicity was the round-the-world Army flight in 1924, made in Douglas planes. Every country in the world watched this flight from the start to the finish. The Woman's Air Derby, from Clover Field to Cleveland, was another event that is air history. The late Kenneth Montee designed and built the winner of the 1925 "On-to-New York" race in his old hangar at Clover Field, and also used the field as base for his first aerial mapping and picture work. Others who either started

operations at the field or used it for their first test flights, include Stearman, Bach, Waterman, Kreutzer, Douglas, Burgess and the Timm brothers. A unit of the Army Air Corps Reserve established headquarters at the field in 1922 and was there until early in 1929, when it moved to its present location at the municipal airport at Long Beach, California.

The present lessees are as follows: Hangar No. 1: J. E. Granger, Inc., Swallow distributor. Tenants: Jack Lynch, W. A. Clark, Pat Farris, Barneson Oil Company; Fred Powell, General Petroleum Company; A. B. Cleveland, Cleveland Publications; Russell Simpson, Avian distributor; Geo. Flaherty, Ford trimotor; and Jeff Warren, Barling NB-3 distributor. Hangar No. 2: Mutual Aircraft Corporation, M. B. Rapp, president. Tenants: Ryan Aircraft Corporation, Wm. Monday, chief pilot; Lewis Aviation Company, Arrow Sport distributor; Kreutzer trimotors, Howard Maisch, chief pilot; Herschel Linvill; Geo. Lyle, Stearman agency; and Porter and Hughes, Buhl distributors. Hangar No. 3: Tanner Air Livery, lessee, C. C. Tanner, president, Stinson aircraft distributor.

A 100-foot highway on the east and north sides of the field, with nearly 100 feet of parking space between it and the boundary fence of the airport, enables hundreds of automobilists to witness the different events and pleasure flights that are of almost continuous occurrence.



Aerial view of Clover Field, Santa Monica municipal airport. The plant of the Douglas Aircraft Co. may be seen at center left



## AMERICAN AVIATION and PAN AMERICAN AIRWAYS

**B**ACKED by whole hearted cooperation of the chief American railroads and of important Groups in America's Aviation Industry, Pan American Airways has grown in two years from a single line of 261 miles, to the largest unified international air transport system, not only in the Americas, but in the world.

More than 12,000 miles of airways in the Pan American System provide mail and passenger transportation to and through the West Indies and Mexico, Central and South America.

Assistance of the United States Government in the form of airmail contracts made this growth possible. Enthusiastic cooperation of the Governments in Central and South America played an important part in developing the unified Pan American System.

Now Pan American comes near to fulfilling the ambitious promise of its name . . . an air transportation system reaching every American country.

### *Pan American Routes*

Daily service from Miami to Havana has grown from one airliner to seven each day. Tri-weekly service to Nassau has become daily. Daily service (except Sunday) has been established throughout the West Indies—Havana, Santiago, Haiti, Santo Domingo, Porto Rico—with weekly service from San Juan to the Windward, Leeward, and

Virgin Islands, Trinidad, and Paramaribo, South America. Tri-weekly mail service to Panama has been extended to include passenger traffic, for the first time bringing rapid, frequent transportation to Yucatan, British Honduras, Honduras, Nicaragua, and Costa Rica.

Meanwhile, starting at Brownsville, Texas, daily service was established to Tampico, Vera Cruz, and Mexico City. Now this line has been extended with tri-weekly service through Yucatan, and tri-weekly service through Guatemala, and San Salvador to Panama. East from Panama, a weekly service through Colombia reaches Curaçao. South from Panama, weekly service passes through Ecuador, Peru, Chile, and—crossing the Andes—reaches Buenos Aires and Uruguay.

### *Through Rail-Air Service*

Complete reciprocal traffic arrangements with chief American railroads provide through Luxury service. It is possible to procure through tickets and reservations at most important railway offices to any point on Pan American Airways—from any point on the airways to chief centers of the United States.

These various achievements, taken together lessen immeasurably the distance between country and country. They represent perhaps the strongest force operating today for Pan American understanding and friendship.



## PAN AMERICAN AIRWAYS, Inc.

122 EAST 42nd STREET, NEW YORK CITY



## KERN COUNTY AIRPORT

**K**ERN COUNTY AIRPORT, rating A1A, comprises 160 acres of beautiful mesa lands northwest of the city of Bakersfield, being 2,640 feet square, all of field available for landing and taking off. This modern port is strategically located between San Francisco and Los Angeles, where the U. S. Department of Commerce maintains a Guggenheim Aerological Printer Telegraph System, giving hourly weather reports, upper air service reports and two weather maps daily on the entire state of California.

The trip between Los Angeles and Bakersfield is considered one of the most scenic routes in North America on a regular passenger or commercial air route. Leaving the southern metropolis, the ship soon attains an altitude of eight to nine thousand feet to clear the Sierra-Nevada and Tehachapi Mountains. Holding this altitude for 40 or 50 miles, it follows famous Ridge Route toward Bakersfield.

Kern County has eight airports. Bakersfield, the county seat and home of Kern County Airport, is located almost in the center of the county of Kern, which is the first county north of Los Angeles, and comprises 8,003 square miles. More than one-half of the county is mountainous area. Kernville and Tehachapi airports are located in the mountain district where sports-

men of Southern California fly to this paradise of fish and game. There are forty duck clubs located between Delano and Wasco in the northwestern corner of the county, most of which are owned by Southern California sportsmen. These two ports are located in the rich agricultural section of the county, the latter being near President Hoover's Kern County farm and the former near the U. S. Experimental Station for Central California. Taft, "the largest little city in the world," is in the heart of the great Midway Sunset Oilfields and on the regular passenger route between Los Angeles and Bakersfield. Maricopa Airport is south and east of Taft, and also located in the oilfields. Mojave has a dandy little airport, possibly the nearest landing field to the Randsburgh mining district. Telephone communication, sixteen times during every twenty-four hours, is received from every port in the county, furnishing information of value to air pilots.

Bakersfield has one Pacific Air Transport mail and express plane each way daily between San Francisco and Los Angeles.

There are at this time three airlines making regular daily scheduled trips between Bakersfield and Los Angeles; Maddux Air Lines, Inc., Continental Air Express and Pacific Air Transport, Inc. The Pickwick Lines expect to be running on a

regular schedule at an early date.

Kern County Airport has three companies operating schools of aviation; Cardiff and Peacock School of Aviation, Golden State Airway, Inc., and Kern County Air Service. Many students have soloed in past few months and are now licensed pilots.

Flying conditions the year around are good in the valley and landing conditions are unsurpassed. Everything to encourage aviation is found here. Plenty of space is available for building individual or private hangars. This port has a modern brick administration building with comfortable rest rooms, restaurant, underground gas filling stations, etc. Every courtesy is shown visiting pilots and the traveling public.

Kern County Airport is the first airport to be owned and controlled by a county. The Kern County Air Commission is composed of the following members: C. Howard Nichols, chairman; E. A. Duncan, secretary; Raymond Grey; Don Cardiff; C. L. Gibson; Dr. R. M. Jones, airport surgeon; H. B. Griffiths, airport superintendent, and Harry Davis, weather reporter.

The airport is located at latitude 35° 25', longitude 119° 3' 30". Its altitude above sea level is 470 feet. Magnetic variation 16° 31' 30" E, 1927; annual decrease 15". Distance and direction from city, 3½ miles north and one mile west of Bakersfield.

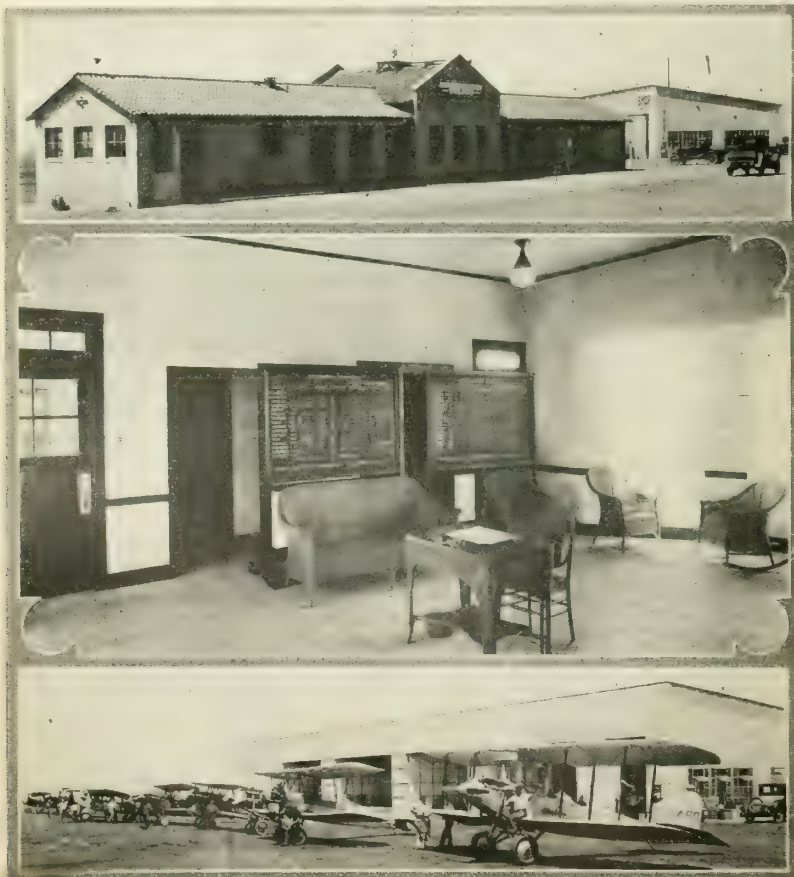
The field is square in shape, measuring 2,640 feet on each of its four sides. The surface is graded level, and its drainage is natural. The surface in front of hangars is oiled to eliminate dust. Landing strips and runways are oiled; they are laid out in the form of the letter T and are for wet weather use. The strip running southeast to northwest is 200 feet wide and 3,700 feet long. That running southwest to northeast is 200 feet wide and 1,400 feet long. A 100-foot circle marks the intersection of runways.

Telephone lines run along the north, south and east sides. Buildings are located in the northeast corner of the port with a beacon on the administration building which flashes the code letter B (— — —) for Bakersfield. Boundary lights are on west side of field. Red obstruction lights are on standards along pole lines on north, south and east. Floodlights are located half way down on the east side of the field. Illuminated wind cone and Neon illuminated weather vane are on the southeast corner. Hangars and the administration building measuring 20 by 120 feet are floodlighted.

No landing fee is required from visiting planes. Transient storage rates are \$1.50 per day or \$24 per month for a 40-foot hangar; \$30 per month for a 50-foot hangar, or 60 cents per front foot. The buildings on the field include one steel hangar 40 feet by 245 feet, two 40-foot hangars, two 50-foot hangars, one 60-foot hangar and one 25-foot shop. Facilities are available for repairs. One underground gas and oil service system is provided and local oil companies furnish tank wagon service.

Other facilities at the port include day and night guard, fire apparatus, first aid service, quarters, and transportation to Bakersfield.

(Continued on next page)



Scenes at Kern County Airport; the administration building, hangars, and planes

# NATIONAL SHELBY AIRCRAFT TUBING

NATIONAL-SHELBY Aircraft Tubing conforms in every way to the same high standards of quality and accuracy of dimensions as the established line of NATIONAL-SHELBY Mechanical Tubing long used by automobile manufacturers and by makers of other high class mechanical constructions. Every foot of this product passes through an intensive system of testing and inspection. The tests for both chemical and physical properties are made to conform to U. S. Army Specifications No. 57-183 for streamline tubing, No. 57-180-1A for mild carbon seamless steel tubes, and No. 57-180-2A for chrome-molybdenum seamless steel tubes. All chrome-molybdenum tubes are made of electric furnace steel of exceptionally high quality and durability. Complete analysis and information on chemical and physical properties will be gladly furnished.

NATIONAL-SHELBY Aircraft Tubing is carried in stock by distributors located at convenient points throughout the country. These stocks are carried in specific lots so that actual test reports which accompany shipments from the mill can be furnished for each lot of material at the time of delivery.

Write for booklet "NATIONAL-SHELBY Aircraft Tubing" which furnishes, in compact, handy form, information concerning seamless steel tubing for designers and builders of various types of aircraft.

## NATIONAL TUBE COMPANY

*Frick Building, Pittsburgh, Pa.*

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

PRINCIPAL SUBSIDIARY MANUFACTURING COMPANIES:

AMERICAN BRIDGE COMPANY  
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UNIVERSAL PORTLAND CEMENT COMPANY

*Pacific Coast Distributors—United States Steel Products Company, San Francisco, Los Angeles, Portland, Seattle, Honolulu. Export Distributors—United States Steel Products Company, New York City*



(Continued from preceding page)

The meteorological agency is in charge of Harry Davis, of the Department of Agriculture. Prevailing winds during the year are northwest. Heaviest winds are usually from northwest or west. Highest recorded wind velocity is about 40 miles per hour.

Dense fog occurs 10 days per month during January and December, 4 days per month during February and November, 1 or 2 days per month during March and October, and very infrequently from April to September inclusive. Light fogs occur 12 days per month during January and December, 5 or 6 days per month during February and November, 1 day per month during April and October, and very infrequently from

May to September, inclusive. Fogs appear generally during above mentioned dates between 5 a.m. and 9 a.m. and clear up during the early forenoon.

Precipitation as heavy as one inch or more in 24 hours is very infrequently recorded. Snow is practically unknown. Weather maps are recorded twice daily at the local airport on display boards in waiting room at port. Complete State weather reports are transcribed over Guggenheim Aerological printer telegraph system every 90 minutes and operated by U. S. Department of Commerce. Also anemometer, barometer and aneroid barometer service is available. The nearest weather bureau is at Los Angeles and the nearest upper air observer at Lebec.

## COORDINATED BUS SERVICE AND AIR TRANSPORT

By A. H. REED  
*of the Pickwick Corporation*

**W**ITHIN the last decade, the motorbus has sprung into world-wide prominence as a great and rapidly growing transportation medium. Within less time than that the airplane has changed from an experimental contraption, deemed generally as fit only for barnstorming exhibitions at country fairs, to a tremendously important factor in the field of commercial transportation.

Comes now the sleeper bus! A year and a half ago the Pickwick Stages System, of Los Angeles, transcontinental motorbus operators, introduced to the transportation world the first compartment sleeper bus with seats which are convertible into beds for night travel. Today the Pickwick Company is completing in Los Angeles a \$200,000 factory where some 300 skilled workmen will be employed in quantity production of these Nite Coaches, official name for the Pickwick sleepers.

Two improved model sleeper busses were placed in service by Pickwick last June 26 on the 460-mile run between that city and San Francisco. These Nite Coaches are the only sleeper busses of any description in use in this country west of Cleveland, Ohio, according to the best information obtainable. The only other sleeper busses built to date are an extremely limited number in this country and in England, and all are

of the fixed berth type, unsuited for day travel.

Inauguration of Pickwick Nite Coach service between Los Angeles and San Francisco met with instantaneous and enthusiastic response from the traveling public. The patronage has reached a point where addition of two more Nite Coaches has become necessary, it was stated recently by Charles F. Wren, president of the Pickwick Corporation.

Pickwick also lays claim to being the first motorbus concern in this country, or the world, to engage in commercial aviation. Pickwick stages took wings last March 29 when the country organized its subsidiary, Pickwick Airways, Inc., and started operating a fleet of trimotored, ten-place passenger planes between Los Angeles and San Diego. So successful was this venture that on May 12, last, a line was inaugurated between Los Angeles and San Francisco. The planes are built by the Bach Aircraft Company of Los Angeles and are powered with Hornet center and Wright J-6 wing engines.

On July 29, Pickwick Airways took over the Latin-American Air Transport Company of Mexico City and inaugurated a tri-weekly air mail, express and passenger service over the 2,400-mile air route from Los Angeles to Mexico City and Guatemala

City. This operation is a story in itself, and will be touched on only thus briefly here.

With the inauguration of the Nite Coach service between the two Pacific Coast metropolises, a linking of the service with the air passenger service was the logical step. The airplane and Nite Coach schedules therefore were coordinated to enable travelers to fly by Pickwick plane from San Diego to Los Angeles late in the afternoon; arrive in time to board a Pickwick Nite Coach at 6:30 p. m.; arrive in San Francisco at 9 a. m. rested and refreshed from a sound night's sleep; board a Pickwick connecting airliner and arrive in Seattle just twenty-three hours after taking off from San Diego.

The new Pickwick Nite Coaches provide the last word in comfort, convenience and economy for bus travelers. Constructed entirely of metal and with accommodations for twenty-six passengers for day or night travel, these sleeper busses represent years of study and research on the part of the designer and Pickwick officials.

Designed and built under the supervision of Dwight E. Austin, chief designer and superintendent of the body department for Pickwick Stages, the 1929 model, like its predecessor of 1928, has patents pending. The interior is arranged in thirteen compartments, seven on the right side and six on the left, staggered up and down on two levels.

Each compartment has two seats, one facing the other. The seats are tapestry covered and air cushioned. At night the backs of the seats form the lower berth. Removable air mattresses are stored in the rear baggage compartment for day travel. Each berth has a light at its head and foot, and the lower berths each have port holes at head and foot for ventilation.

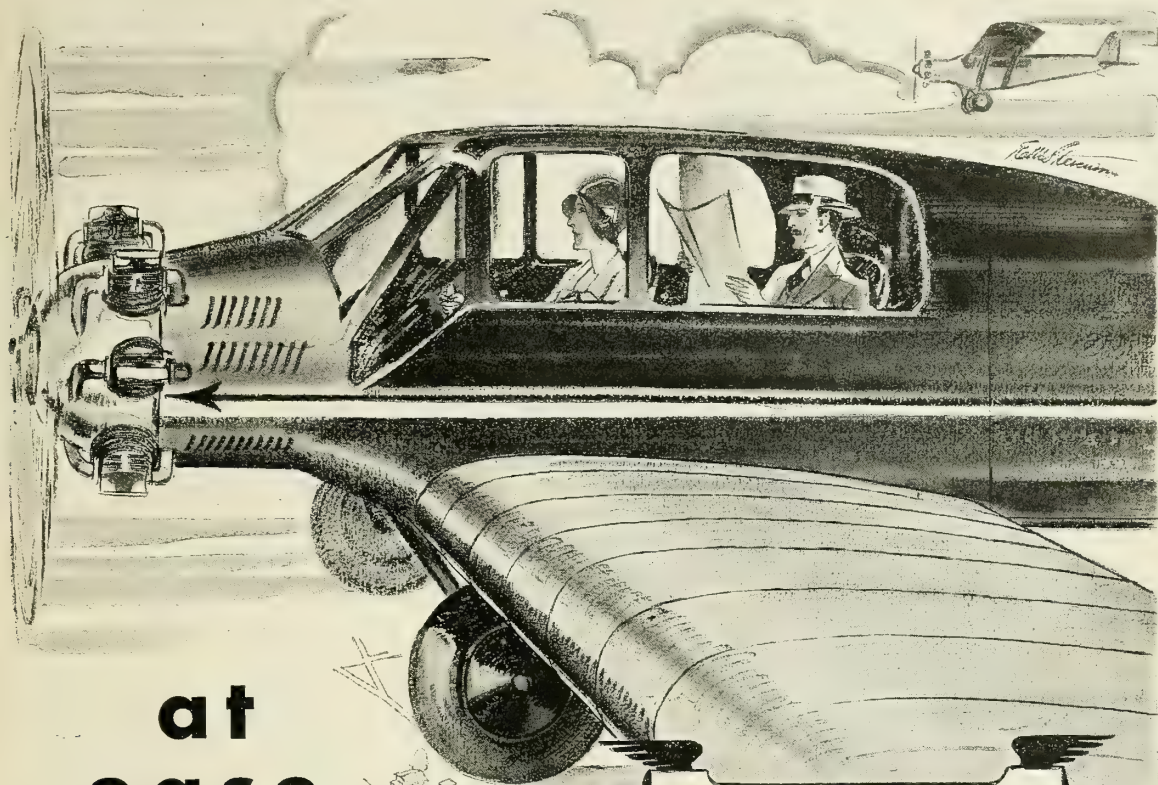
Just inside the entrance to each compartment is a space three feet long and six feet four inches high, for undressing and dressing. This space is fitted with folding wash basin with hot and cold running water, mirror, ash trays, thermos drinking jug and other conveniences. Portable dining tables when not in use, are carried in the baggage compartment at the rear.

Complete privacy for compartment occupants is achieved by drawing the heavy

(Continued on next page)



Passengers boarding a Bach trimotor air transport to complete a journey begun on a Pickwick bus



# at ease in the air

Of two engines with equal power, that one is better which never exerts itself to the utmost—never strains itself in developing its rated power—never sacrifices strength for reduced weight.

This is the Comet idea—the first departure from wartime standards in aircraft engine design.

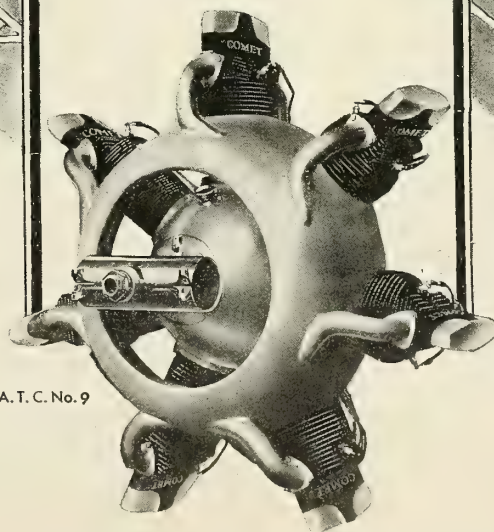
Men and women who take the air with Comet engines enjoy flying ease, because Comets always function well within their limits of mechanical strength, always hold an ample reserve in the interest of steady, unfailing operation.

Working without strain, Comet engines give hundreds of hours of uniform service, without overhaul or expert attention.

Comet brings to flying the same ease and certainty of operation that drivers of automobiles accept as a matter of course.

Theory says that aircraft engines should deliver maximum power for minimum weight.

Practice says that weight may be too low in proportion to delivered power. Reduced weight may mean reduced strength.



A. T. C. No. 9

## COMET ENGINE CORPORATION MADISON, WISCONSIN, U. S. A.

Comet aircraft engines are manufactured at Madison, Wisconsin, under the direction of the Gisholt Machine Company, for 40 years builders of fine machine tools in use throughout the world... 7 cylinders, 150 horsepower (manufacturer's guaranteed rating)





Breakfast aboard a Nite Coach of the Pickwick Stage system; and (right) berths in the bus for night travel

(Continued from preceding page)

tapestry curtains, similar to Pullman coach arrangement. Heavy carpets cover the floors of the compartments and smoking compartment and the central aisle running the length of the coach.

The interior of the coach is finished in a delicate French blue lacquer, with at-

tractive mural decorations and stripings in harmonizing colors. The coaches are adequately lighted throughout with electric lights in specially designed brackets and shades.

Passengers are assured fresh air at all times by the forced air ventilating system which uses washed and filtered air.

## AIRPORTS IN THE MIAMI DISTRICT

By E. W. Sudlow

**B**ECAUSE of the diversified interest of the operators of the several airports near Miami, there is no direct competition between them. There is a great need for an airport in each one of the localities in which they are now located.

Miami has at present four airports and four seaplane bases. There is a municipal airport which is known as a free port; that is, no one is charged for the privilege of landing or taking off from there. This field was a gift to the city from Mr. Glenn H. Curtiss, who stipulated in his deed that free use of this field should be given at any and all times to every private and commercial pilot and to the military arms of all the states. There are standard charges for the use of hangar space and for whatever mechanical service the pilot wishes to have. The operation of this airport assures the aerial visitor that no matter what time he may set his plane down there, there will always be some one on hand to provide him with transportation to the heart of the city and give any necessary attention to his ship.

The next airport south of this in the belt of fields which surround Miami is a privately owned field belonging to Mr. Marcus Milam, who rents space and operating privileges to private operators. This field is located seven miles from the heart of the city, and is reached by fifteen-minute bus service. The dimensions of the field are 4,000 feet east and west, by 3,000 feet north and south. It is marked by a white circle. Pilots and a mechanic are available at all times.

The Marine Corps non-stop flights from

Miami to Nicaragua were started from this field. It was also used by the Marines as a landing field during the war. Present commercial operations at the field include aerial photography and cross-country pleasure and business trips. Short sightseeing trips are also featured and are popular. Every Sunday exhibition flying attracts great crowds of visitors. A flying school is also operated.

Pan American Airways, Inc., which holds the contract for carrying mail between the United States and the Panama Canal Zone and South America by way of Havana, as well as the mail contract between Miami and San Juan, Porto Rico, last year built a 130-acre airport of the most up-to-date design, ten minutes from the hotel and business center of Miami. The hangars are of steel construction with a 120-foot clear span, each capable of housing four trimotored Fokkers, which are used on the Pan American mail routes. Located on the field is a complete passenger station with separate waiting rooms for incoming and outgoing passengers. This building is said to have cost \$75,000 and is one of the best of its kind in the United States. There are accommodations for immigration and customs officials in the same buildings, together with long distance telephone, telegraph and radio facilities. The maintenance, repair and overhauling of engines is done in a building adjoining the main hangar. This airport is privately owned and operated, because the operations of the Pan American Airways are so extensive that there is no room to accommodate transient pilots.

The fourth in the group of airports is located in Coral Gables and lies to the south of Miami. Operated by the University of Miami, this field is about seven miles from the heart of Miami, with rapid transit and bus service to all parts of the greater Miami area. The field is peculiarly well adapted to the purpose for which it is used—student training. Coral rock underlies all of the area, and when scarified provides a smooth hard landing surface. Planes are able to take off or land during rain storms without the dangers usually associated with boggy fields. Besides instruction, sightseeing trips and cross-country service are offered. Although the field is not a municipal airport, it is subject to lease to any private companies who may wish to operate there.

On an island in Biscayne Bay connected to the mainland by a causeway from Miami to Miami Beach is the Municipal Seaplane Base. Built according to navy specifications, the ramp will hold the heaviest flying boats now in use. High test gasoline is available here and repairs and supplies can be had, as well as hangar space. There are several acres of ground connected with the ramps and hangar so that a great many flying boats can be taken care of at the same time by being run up on shore.

There is a privately owned seaplane base belonging to the Curtiss Flying Service at the foot of Seventh Street, where gas, oil and service are obtainable. Charter trips are made from there to the West Indies and Havana.

The old Naval Base at Dinner Key, which is still available for flying boats, has a concrete ramp stretching for a thousand feet along the shore line, and is perhaps the largest seaplane base in the world at the present time. It was built by O. A. Sanquist of Miami, designer of the Sanquist system of seaplane ramp construction, for which he holds the patents. Navigable water extends without obstruction from the ramps five miles in every direction, and no yachts are anchored in the seaplane lanes.

This well-balanced combination of airports and seaplane bases puts Miami in an unique position among American cities.



A Spartan training plane, powered with a Wright Whirlwind motor, fully equipped with instruments and brakes.



A class in parachute instruction. Parachutes are worn during all cross-country and acrobatic flying.



A view of the welding school. All flying and mechanical students receive welding instruction.



One of the Ford planes operated by Southwest Air Fast Express between Tulsa and seven middle-west cities.

# SPARTAN TEACHES BY GOVERNMENT STANDARDS MILITARY METHODS

At the Spartan School of Aeronautics military methods prevail to the extent that every student's daily activity is a matter of precise schedule. There is no waste of time, no guesswork, no uncertainty. Training planes are always ready for flight at the appointed minute and students report promptly because they appreciate the effort to give them more than a dollar's worth of instruction for each dollar spent.

## Pride . . . and the Spartan Honor System

Spartan students are proud of their school and its business-like methods of operation. Students realize that the Spartan staff is constantly making an earnest effort to give them the best flight and ground school training available and they respect the honor system of discipline which requires neither rules nor regulations. The result is excellent co-operation between students and the school staff.

## SPARTAN ADVANTAGES

Spartan offers ten outstanding advantages to the student-pilot: 1—The School is licensed by the U. S. Department of Commerce as both Transport flying and ground school. 2—All flight and ground instructors are government-licensed. 3—A liberal extended tuition payment plan is available to students. 4—Student dormitories and cafe provide excellent living conditions at reasonable cost. 5—Air transportation to Tulsa from Safeway terminals in Ford planes provided without charge to new students. 6—All open cockpit and cabin training planes powered with air-cooled motors including Wright Whirlwind. 7—A scientifically arranged ground course including instruction in theoretical, technical and business subjects. 8—Unusual cross-country flying privileges. 9—Reasonable tuition charges in all courses. 10—An ideal climate for year-round flying.

## COURSES

Spartan offers three courses which qualify graduates for license examination in the following grades: Private, Limited Commercial or Transport Pilot.

**MECHANIC'S COURSE:** A complete, scientifically arranged course of Mechanical instruction, including airplane and motor theory, aeronautical instruments, air commerce rules and regulations, aluminum and steel tubing welding, practical shop work on new production planes and motors.

**WELDING COURSE:** A practical course in welding, including airplane and motor theory, aluminum and steel welding practice. Our welding equipment is complete to the smallest detail and course is conducted by an experienced welding instructor.

## SPARTAN SCHOOL OF AERONAUTICS TULSA, OKLAHOMA

### MAIL THIS COUPON

SPARTAN SCHOOL OF AERONAUTICS, Tulsa, Oklahoma.

Gentlemen: Please send me literature or information on subjects checked below:

☐ Illustrated booklet describing all Spartan courses.

☐ How I may make use of the Spartan extended tuition payment plan.

☐ Particulars concerning your offer to pay my air transportation fare to Tulsa.

NAME \_\_\_\_\_

AGE \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_



Norman G. Souther, business manager of the Spartan School, who will give your inquiry his personal attention.



# PERSONALITIES



by Caldwell

**A**MONG the ghosts from the past that occasionally rattle their bones in these pages, I mentioned recently the R. E. 8, or Harry Tate, and I didn't speak at all respectfully of it. This so infuriated Clayton Knight, famous illustrator of air stories, that he takes his stenographer by the hand and deposes as follows:

"The old busses must all be dead and gone and it is downright disrespectful of you to speak of them as you did. Mind you! they had their faults; you had to use your head and considerable top rudder in a turn—if not the latter, then the head was just no use afterwards. And, as anyone who can appreciate beauty will testify, never has there been such an ugly contraption take the air. Plenty of dihedral, a sweep-back, and a comic scoop in front to catch what breeze there was to cool its fevered cylinders. Plenty of wires and a habit of settling itself on the ground like a two-ton truck. And an undercarriage built up of slightly hardened spaghetti. *But* they were doing their job right up to November 11, 1918. And a tough job it was, ranging artillery. Most of the time the pilot did the shooting, hanging over the side and watching for the gun to flash, then swinging back towards Germany and waiting for the shell to strike, heave her around and send down dots and dashes to correct the aim, then round about and repeat the dose. Fly? Of course they'd fly, with an old hand at the stick. And they were very apt to be required to fly out of the center of a mess of Fokkers who could fly too. I went one day to the depot to get a new machine and there was a fellow getting an R. E. 8. His face was well covered with plasters and I asked the sergeant what had happened to him, and he said, 'Oh, we get a lot of these R. E. 8 merchants coming back for new machines and looking about like that.' So God rest the old R. E. 8's; they must be tired even where they are."

Clayton sent me his book for boys, *The Non-Stop Stowaway*, but I don't hold that against him—we all have our off moments. The illustrations are excellent, but they have poor literary support. Clayton, you should imitate these ocean fliers and get a ghost writer to write your book for you—I think the public would also prefer that procedure. C. B. Allen remains today the only human, living or dead, who has ever written an interesting book about an ocean flight. And he didn't go on it. But I forgave Clayton for writing that book and asked for his biography, for he is one of those daring lads who leaped into the fray to depose the Kaiser and elevate Volstead.

"For the information of your customers," says he, "I sailed across the sea with that daring band that have come to be known as the War Birds, with Elliott White Springs as cadet in charge." (By the way, don't miss Springs' stories as they appear in *Liberty*; they may not be literary gems,

but they're certainly entertaining. His latest book, *In the Cool of the Evening*, is recommended.) "Arriving in England we fraternized considerable with the populace." (Especially, I imagine, with that portion of the population that decorates Piccadilly after dinner) "After numerous delays at ground schools we took to the air, I in a Quirk with Capt. Flossie Brand (now Sir Quentin Brand) as instructor. I liked the life; it kept you out in the open, although there were complaints. One of my friends, still alive, objected because he said it was both dangerous and draughty. And he still says so. After a few washed-out undercarriages on BE's, RE's and DH-9's and a stay at the fighting school at Marske, I turned up at Room 29 at the Air Ministry and was given a chit sending me out with the forces. Crossing over on the Channel boat, I glanced casually at the news of the war and discovered that there was 'continued activity by the enemy, and fifty of our machines failed to return.' It made me feel funny. At 206 squadron they seemed not to be so worried. And in no particular hurry either, for it was three days before I saw the lines, and looked down on Ypres—like a poor battered graveyard in the setting sun.

"No. 206 was the Intelligence Squadron for the British Second Army and we did a lot of nosing about behind the lines from Dixmude to Armentiers. They very nearly

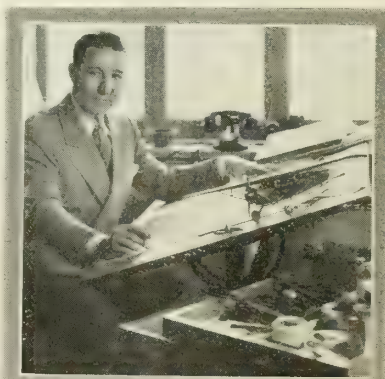
had to pack up my kit at the squadron one afternoon when I was acting as escort to another fellow out getting information. Four Huns kept picking away at me all the way back to the lines, but I had a good observer, and after considerable twisting and turning they gave us up and went home, one of them out of control. My tail was in shreds, but that could be charged up to the observer. He wanted to fire all the time.

When we did get shot down on October 5th, we were too far behind the lines to get back. I got an explosive bullet that went in my knee and out my hip, fortunately breaking no bones. They must have hit my tank too, for the engine quit and we flopped down in a field near Courtrai and went over on our backs. I learned that an Ober-leutenant Affarth got the credit—I was his 23rd. Then I was a guest at five different German hospitals until the Armistice, then a couple of Belgian, a French, and a few English hospitals. Then Home. I brought back a few sketches and a lot of memories. They all rested dormant until I ran into Springs one day and he said he had a story or two that needed illustrating. Could I do it? All I wanted was a chance, and Pelmanism did the rest."

Knight's airplane illustrations are spirited, dashing, and—wonder of wonders!—technically correct. His sketches of war airplanes are a delight to the old pilots who flew them. But I told him that his officers were too handsome—we never looked like that!

"Didn't we?" he writes. "Don't forget that you are looking back with misty and rheumy eyes, and that when you meet the old crowd they are not as they once were, but tougher and fatter and bald. Look at Tipton these days! I have some old uniforms in my studio that I wore and that some of my friends wore—and just try to get a regular sized person into them or the boots. When I need a model I have to depend on largish boy scouts or chorus men."

I guess he's right. No matter what we are now, God pity us, we once were handsome, dashing young men.



Clayton Knight, illustrator, in correct pose

**D**ID you hear this one? Lloyd Yost vouches for its truth. It seems Captain Elliott White Springs, the sheet-tester of Fort Mill, S. C., had a speaking engagement in Chicago. He hired a plane to take his party to Chicago. Since the pilot didn't know the route, the bold Springs up and says, "I'll navigate for you." After an hour or so of the best Springs navigation—and it should be pretty good, because Elliott has written articles on flying about the country—they landed at Knoxville, Tenn., for gas. Whereupon the personnel of the Greenville, S. C., airport rushed up to greet them and to inform them that they had landed at that charming city, and not Knoxville!

THE trouble with most of us is that we start too high up on the ladder of success—from which vantage point we fall with a hollow plunk to the ground. You've heard of the bird who landed in New York with only a dime, and in ten years had a million and indigestion. Trouble with me was that I got there with \$6.73 and still have it. If I had only given somebody the \$6.63 and kept the dime I might have amounted to something. However, no use repining. Probably it's just as well that I'm poor. Imagine me, with a million dollars and my thirst let loose in the bar of an English transatlantic liner. In one week I'd have floating ribs.



John Livingston

But what set me off on this success stuff was the life history of one John Livingston who arrived in this sad world 31 years ago with not a thing on his mind, and certainly no more chance than I had, and yet here he is today general manager of Mid-West Airways Corporation, operating three fields, at Monmouth, Ill., Aurora, Ill., and Waterloo, Iowa. I had five years' start on this bird, and all I'm operating is one Loening and a Corona—and I don't own the Loening and I still owe on the Corona. There's something wrong with this picture, John. But I'll bet I've had more fun than you've had, at that. Some of us take our dividends one way, some another. What I go after is liquid assets.

But never mind me—let's take a glance at honest John, king of the toilers. He started off in a garage as a mechanic and tore motors apart with such hearty good will that there was hardly a car in Iowa that John hadn't torn something off of. Sometimes he got it back on, and sometimes he didn't. But after expending his youthful fury on decrepit Fords, he learned to fly and went barnstorming. For some time he went on a diet of hamburgers and coffee, until he entered the employ of Mid-West Airways as a mechanic and pilot. In the following year he won first place for water-cooled motors in the Ford Reliability Tour, flying a Waco. Last year, in winning the Class B event from New York to Los Angeles, John collared the lion's share of the cash prizes, which included the sweepstakes award, every lap prize, and the Elizabeth Miller special prize of \$1,000—a total of \$14,410. Not bad pay for less than a week's work, is it? No wonder the schools are crowded with young men hankering to become pilots. I think I'll have to go to one of them myself.

A word about Mid-West. In 1922 it appeared to be headed in the general direction of the bow-wows, until late in that year when the management was handed over to Livingston, who entered into contracts with Waco and later with Ryan for sales rights to those planes. To date, over 115 planes

have been sold, schools are operated at each of the three fields—and John is sitting at a mahogany desk reaping the reward of toil and telling the boys what to do. When he tires of that he climbs into his sport Waco and pulls off a few stunts, just to freshen up. Then he goes back and works some more. He seems to enjoy work. All in all, he seems to be a very peculiar fellow. I must drop down and see him some day, only I know the sight will sadden me. To see anyone working as hard as John must work would be a distressing sight to me



DO you know how Major Lloyd O. Yost happened to get into aviation? He got tired rolling milk cans for his father, who ran a creamery business in Myerstown, Pa., where Lloyd was born in January, 1897. He arrived January 2, thus just missing being a New Year's present. His father sent him later to Ursinus College, where he specialized in physics and chemistry, learning the proper proportion of milk to H<sub>2</sub>O. But in 1917 the old man sold out to the Hershey Chocolate Company. I guess the well must have gone dry. About that time the war got under way, and inasmuch as Lloyd had seen enough milk to last a lifetime, he joined the Air Service as a first class private and started peeling potatoes at Taliaferro Field, Hicks, Texas, Camp Dick at Dallas, and any place where there was a potato that needed its overcoat removed. He was commissioned a 2nd Lieut. July 1, 1918, and started his career as a flying instructor. He roomed with Elliott, Locklear, and Short; and when Locklear went later on his plane-changing tour he left Yost behind, because "he was too conservative," Locklear said.



Lloyd Yost

In August, 1919, Lloyd left the Air Service and bought a Canuck with which he barnstormed in Texas and Oklahoma, arriving finally at Uniontown, Pa., where he draped the Canuck deftly across a fence while trying to take off from a small field. "Went back to Dallas and got another Canuck and so on," he writes.

"And so on" what, Lloyd? You don't give details but I presume you mean, "and so on to the next fence." From 1921 to 1926 he operated Millard Field, near Palmyra, Pa., when he moved to Conyngham, Pa., which he makes his base in summer, and to Pinehurst, N. C., where he spends the winters, running a school and taking up famous golfers and writers. He is also Fairchild and Waco distributor.

If you're in Lloyd Yost's part of the country and need help, just call on him; he's one of the most helpful, kind-hearted pilots in the game. He's full of what they call the milk of human kindness, probably due to his early association with the milk business.

THE determined looking officer to your left is 2nd Lieut. J. F. Guillett, of the Air Corps. He isn't a savage fellow at all, as you might imagine from the picture, but he is determined.



J. F. Guillett

He got that way from being born and raised in the swamps of Louisiana. A boy simply had to be determined if he wanted to get anywhere with all that mud clinging to his boots. He used to get lots of places during the war, when he was only thirteen. They had a flying field located in a swamp near the swamp he lived in, and he used to play hookey from school and wade over to it. He really liked that swamp better than he did the one the school was in, and in time he got a sort of waterway tramped down between his home swamp and this Gerstner Field swamp. From this youthful traveling came his love for cross-country flying—which makes us kindred souls, for if there's anything I like, outside of Bourbon, it's flying cross-country. I absolutely wouldn't stay around a field instructing or passenger-hopping. I'd sooner work in a bank or paint lamp-shades or be a floor walker.

I wrote him a letter, to which he replied: "I can tell you are a bug on cross-country (X-C) flying. I agree with you. I like to go X-C and start early and keep going until dark. With a 500-mile limit, I take a slow ship and go and come back the same day. But with the advent of faster ships and bigger tanks, the idea of raising the limit from station to 1,000 miles instead of the present 500 is gaining in favor rapidly. Now I'm instructing in the basic school, and the usual run is about 45 hours a month and five may be cross-country. With ships available pilots can get in 2,000 miles a month without an act of Congress. I imagine I've flown about 750 hours X-C in the last three years. I like it more than anything, and am hoping to fill up a three months' leave with that and a mail plane somewhere."

I am a strong advocate of more cross-country flying for Army and Navy pilots. Under the present system I don't think they get nearly enough X-C work. For one thing it makes them better pilots, and for another it keeps them from going stale on the station. If there's anything more deadly dull, more numbing to the intellect, if any, than hanging around some desolate field, I'd like to know what it is. Frequent long flights, not only within certain limits, but over the whole country should be arranged.

But I was forgetting the cause of all this—Guillett, the ex-swamper. Born in a swamp in 1904, he entered the Air Corps at Brooks Field in 1924; graduated attack course at Kelly Field 1925 with A. P. rating. Commissioned June, 1926. Served in Third Attack Group, then went to Brooks Field for duty as instructor in Air Corps Primary Flying School. I hope they hand him an airplane and tell him just to go places in it.



# TECHNICAL

## PRATT & WHITNEY WASP JUNIOR ENGINE

A NEW 300-horsepower nine-cylinder air-cooled radial aircraft engine known as the "Wasp Junior" has been extensively tested and will be put on the market soon. This step marks a radical departure from the policy of the Pratt & Whitney company, which since its inception four years ago has devoted all of its energies to the high-powered aircraft engine field.

The new model which is of 985 cubic inches displacement, weighs 550 pounds and is 45¾ inches overall in diameter. It is essentially the Wasp engine with a new power section and its rated power is delivered at 300 horsepower at 2,000 revolutions per minute. It has an equal bore and stroke of 5-3/16 inches.

The new engine was brought out to meet the requirements for an engine of this size, having the dependability and long life that have made the Wasp and Hornet engines internationally famous. It incorporates all of the features of the Wasp and Hornet and by standardization of design, 80 per cent of the parts are interchangeable. Even the mounting dimensions are identical. Due to the use of so many of the tried and proved parts of the Wasp engine, none of the difficulties usually encountered in bringing out a new model have been experienced, and it is expected it will equal the enviable record for reliability and performance attained by the Wasp and Hornet, which between them have established twelve world's records for speed.

By FREDERICK B. RENTCHLER  
*President, Pratt & Whitney Aircraft Co.*

range and endurance, which covers practically the entire field of airplane performance.

Types of planes which will be able to utilize the Wasp Junior will include among others the four and five-passenger cabin planes, the two and three-place open commercial planes of high performance characteristics, the light cargo carrier used on feeder lines, the smaller sport amphibian and trimotored transports of the smaller type. The Wasp Junior is also expected to have an interesting military and naval application for small high performance aircraft.

It is an interesting fact that the use of the Wasp parts has caused but little increase in weight. The accompanying illustrations show the similarity and relative proportions of the Wasp Junior and the Wasp. In addition to being geometrically similar, the same materials are used and the same material control and care in manufacture are exercised as in the Wasp.

Due to the use of the standard rear crankcase section, the engine has the same mounting circle as the Wasp which should prove a very valuable feature to the airplane manufacturer who desires both a 300 and a 420-horsepower engine. Like the Wasp and the Hornet, the Wasp Junior is available with propeller reduction gears.

The following are the specifications of the Wasp Junior 300-horsepower radial air-cooled engine:

### Specifications

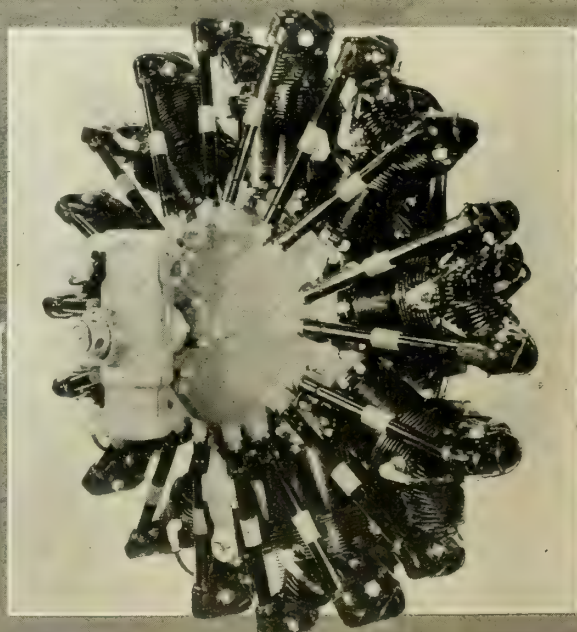
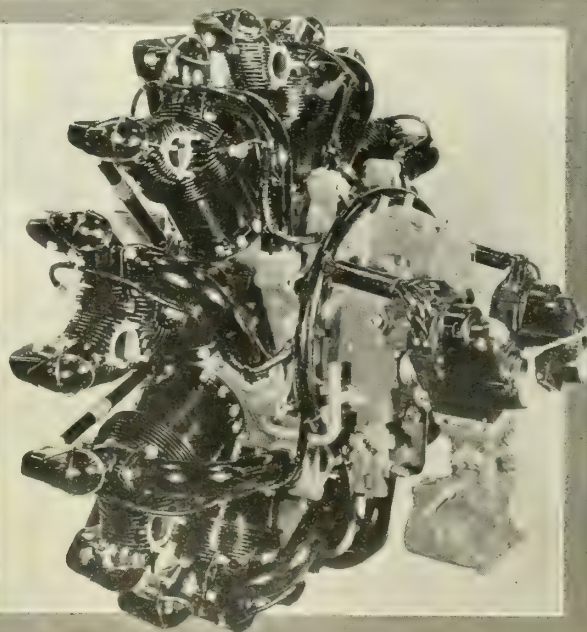
Type .....	air-cooled fixed radial
Number of cylinders .....	nine
Bore .....	5-3/16 inches
Stroke .....	5-3/16 inches
Displacement.....	985 cubic inches
Guaranteed power at 2,000 r.p.m.....	300 h.p.
Weight .....	550 pounds
Length overall.....	41 3/32 inches
Diameter .....	45¾ inches
Propeller hub.....	Standard S. A. E. No. 30
Fuel consumption at 300 h.p.	

.55 lbs. per h.p. hr. max.

Oil consumption. .025 lbs. per h.p. hr. max.

IN addition to bringing out the "Wasp Junior," the Pratt & Whitney Aircraft Company will have manufactured approximately 200 Wasp and Hornet engines a month during the year 1929 as compared with 65 engines a month in 1928. The company is the largest manufacturer of high-powered aircraft engines in the world and does a greater volume of business than any other aeronautical concern on record.

The total mileage of Pratt & Whitney engines flown daily on regularly operated transport lines carrying passengers, mail and express approximates 68,000 miles. This is an interesting figure when it is realized that



Views showing accessory and propeller ends of the new 300 h.p. Pratt & Whitney "Wasp Junior" engine



only 91,000 miles are scheduled to be flown daily by regular operators. Two companies alone, The Pan American Airways system and the Boeing System using Wasp and Hornet engines exclusively, fly approximately 20,000 miles daily. The Boeing System, which has used our engines exclusively since its inception, has flown 7,000,000 miles.

Construction work on the new plant in East Hartford, Conn., which when completed January 1, 1930, will be the largest and most modern engine manufacturing unit in the world, is progressing rapidly. Production facilities will be increased 100 per cent. The new plant will contain approximately 500,000 square feet and will cost \$2,000,000. A new plant is being erected alongside the Pratt & Whitney unit for the Chance Vought Corporation, manufacturers of the Vought Corsair. It will cost in the neighborhood of \$1,000,000. When completed, manufacture of Vought planes at the Long Island City plant will be discontinued and the entire personnel and equipment moved to East Hartford.

The Pratt & Whitney Aircraft Company is a division of the United Aircraft and Transport Corporation of New York City. Other companies included in this group are: Boeing Airplane Company, Boeing Air Transport, Inc., Seattle, Wash.; Pacific Air Transport, Seattle, Wash.; Chance Vought Corporation, Long Island City, N. Y.; Hamilton Standard Steel Propeller Company, Milwaukee, Wis., and Pittsburgh, Pa.; Northrop Aviation Corporation, Burbank, Calif.; Sikorsky Aviation Mfg. Corp., Bridgeport, Conn.; Stearman Aircraft Com-



The Pratt & Whitney Wasp Junior (top) compared with the regular Wasp

pany, Wichita, Kan.; Stout Air Services, Inc., Dearborn, Mich.; United Aircraft Exports, Inc., New York City.

## FLIGHT TESTS of STINSON SEAPLANE

DEPARTMENT OF COMMERCE test flights were made recently of the Stinson Junior and Stinson-Detroit equipped as seaplanes. The tests on Lake St. Clair were made from Baltimore Bay, and highly satisfactory results were obtained, according to Edward A. Stinson, president of the Stinson Aircraft Company.

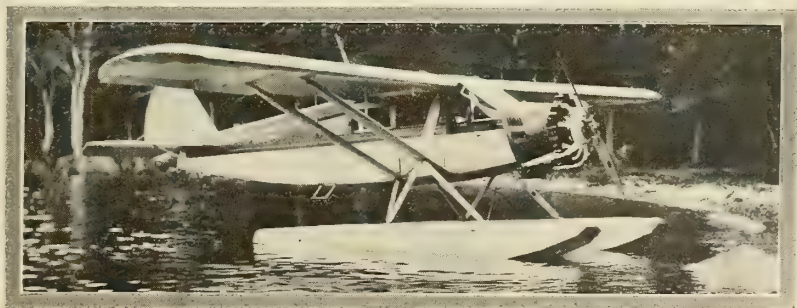
Equipped as a seaplane, the Stinson-Detroit weighed 3,060 pounds empty. With a useful load of 1,440 pounds the plane took off in 30 seconds. At the time of the tests, an eight-mile wind was blowing offshore and the temperature was 90 degrees Fahrenheit. A Wright Whirlwind 300 engine was used, which is standard installation on the new Stinson-Detroit. For water operation, the Detroit is licensed to carry a gross weight of 4,500 pounds, which allows for a full load of six passengers and baggage with sufficient fuel for a 550-mile cruising radius. This loading is 200 pounds over that which the plane is licensed to carry as a landplane. Top speed obtained was 125 miles per hour and initial climb was 475 feet per minute. Edo pontoons were used on the tests.

The four-passenger Stinson Junior was powered with the new seven-cylinder Wright Whirlwind 225 and fitted with Fairchild pontoons. Empty, the plane weighed 2,396 pounds. Tests were made with a useful load of 1,124 pounds, a gross loading of

3,520 pounds. This loading allows for four passengers and baggage with fuel sufficient for a cruising radius of 500 miles.

With the full allowable Department of Commerce load on board, the plane took off in 25 seconds. With 743 pounds of useful load on board, it took off in 17½ seconds. Initial rate of climb with full load on board was 500 feet per minute. A top speed of 120 miles was obtained.

Equipped with wheel landing gear, the Stinson Junior is licensed to carry a design load of 1,109 pounds or a gross load of 3,200 pounds. Tests were also made on this model and take-off time required was 10 seconds. A distance run of 522 feet was required and 261 feet was required for landing with full load.



Stinson-Detroit equipped with twin Edo metal floats

## BUREAU OF STANDARDS EXPERIMENTS WITH INSTRUMENT LIQUIDS

EXPERIMENTS to develop a liquid suitable for use in aircraft instruments have been commenced by the Bureau of Standards, Department of Commerce, in co-operation with the National Advisory Committee for Aeronautics. At present damping liquids are used in aircraft compasses and lateral inclinometers. Artificial horizons of the bubble type depend for their operation on liquids having the same characteristics which are important in a damping liquid.

After giving due consideration to the factors of invariability with time, low volatility, constancy of index of refraction and transparency for varying temperatures in the choice of the liquids, data were obtained by the Bureau of Standards on the freezing point and on the viscosity in the temperature range—20 degrees C. to 30 degrees C. The latter property is of primary importance in the selection of a damping liquid.

The freezing point of the liquids should be—40 degrees C. or lower since aircraft instruments may be subjected to low temperatures during the ordinary operation of aircraft.

Measurements of the viscosity were made on solution of animal, vegetable, and mineral oils in xylene, glycerin in alcohol, and solutions. Data were obtained for individual liquids including kerosene, mineral spirits, xylene and recoil (mineral) oil.

The object of the investigation was to find a liquid or liquids which had a high viscosity at about 25 degrees C. and small temperature coefficient of viscosity. A criterion for comparing the liquids in this respect has been arbitrarily selected as the temperature at which the kinematic viscosity is five times that at +30 degrees C. This fixes the lower temperature limit of usefulness. No liquids with an absolute viscosity greater than 0.05 poise at 25 degrees C. were found for which this temperature is much below —20 degrees C. and none of absolute viscosity of about 0.025 poise with this temperature below —40 degrees C.

Further work is being carried on in extending the lower temperature limit of the data to —50 degrees C. and lower, and in obtaining data on promising liquids and solutions in an effort to find those with a viscosity higher than 0.025 poise at 25 degrees C. which are usable at temperatures down to —40 degrees C.



# BEARDMORE OIL ENGINE

THE following information on the engines which have been installed on the R-101, giant British dirigible which recently made its initial test flight from Cardington, England, is contained in an article in the British technical magazine, *Aircraft Engineering*. A technical description of the R-101 appeared in the November issue of AERO DIGEST.

Five Beardmore Tornado compression-ignition, heavy oil engines of 585 horsepower have been installed on the R-101. Four of these, totaling 2,340 horsepower, are available for forward propulsion. The fifth engine is equipped with a propeller of negative pitch to provide a reversing force.

Hollow-bladed metal propellers with a special hub for giving variable pitch were fitted, but these have had to be, at any rate temporarily, abandoned. This was due to troubles arising from periodic vibration in the crankshaft giving rise to abnormal torque fluctuation. Experiments with solid-alloy bladed propellers with strengthened hubs are proceeding with which it is hoped ultimately to replace the wooden propellers now fitted, and so allow all five engines to give either ahead or stern thrust.

The engines have eight cylinders in line. The engines weigh approximately eight pounds per horsepower. The cylinders have an 8 1/4-inch bore with a twelve-inch stroke. The consumption is 0.385 pound per brake-horsepower per hour, the oil used weighing 8.35 pounds per gallon, having a flash point of 210° Fahrenheit, and costing 14 cents a gallon. This gives a consumption economy of 25-30 per cent, compared with gasoline, the cost of the fuel being, further, approximately one-fifth that of gasoline.

A forty-horsepower auxiliary gasoline engine driving a Bendix pinion is utilized to start the Tornado engines. It has been found that less than ten horsepower is required to run the engine up to 100 to 120 revolutions per minute, at which it starts without hesitation.

The engine is cooled on the evaporative system. Steam passes from the head of the separator to the condenser. This will, it is hoped, ultimately take the form of fabric

ducts in the outer cover, but, though preliminary experiments have been satisfactory, it was not considered wise to fit these yet. Meanwhile, triangular honeycomb radiators are fitted, with relief valves set at two pounds per inch to discharge steam if cooling is inadequate during landing operations. The waste of steam from the two midship engines is led to a large radiator which can be withdrawn to heat the passenger quarters or be lowered into the external air stream.

The fuel storage system is arranged in the hull. It provides fuel supply to each engine car in addition to providing large quantities of fuel that can be moved fore and aft in the airship to alter trim. The storage-tank unit is 224 gallons and is equivalent to 1,870 pounds. It has a clearance volume of 10 per cent. From the storage tank fuel is drained by gravity to a transfer tank to which it can be blown by compressed air to feed tanks above each engine car. Two feed tanks are located above each engine car with a 10 per cent spare capacity above 224 gallons, so that before either is empty it can take the contents of a storage tank. Each feed tank holds fuel for eight hours at normal power. The fuel system is filled through a two-inch main from the bow. This tank is also used for moving fuel fore and aft for trimming.

Compressed air is supplied from compressors in two of the engine cars and is stored at 60 pounds per square inch in a tank in the hull.

The air storage and the transfer tanks are the only ones exposed to pressure. Compressed air is used in the same way for trimming water ballast. For certain selected tanks fuel can be released through special jettison valves. A well-shaped 12-inch orifice is formed in the bottom of the tank and sealed by a 28-gauge aluminum disk. Beneath this disk is a ring carrying seven knives, which, when the ring is rotated, rise and cut the disk neatly out, releasing the fuel. A 224-gallon tank can in this way be completely emptied in 11 seconds.

The eight-cylinder in-line engine was chosen by the designers of the R-101 in order to facilitate installations in a narrow car and to provide accessibility in flight. It is

possible for mechanics to pass along the full length of both sides of the engines and have access to any pipe or joint underneath. The engine installation is designed so that a cylinder head, piston or connecting rod can be removed in flight.

A complete engine car can be changed for a spare one while the ship is at the mast, so that as soon as an improved type of engine is available a power car can be developed for it and the earlier type of car replaced without delay or alteration to the ship.

## RECENT PATENTS

THE following patents of interest to readers of AERO DIGEST were recently issued from the United States Patent Office. Copies thereof may be obtained from R. E. Burnham, patent and trade-mark attorney, Continental Trust Building, Washington, D. C., at the rate of 20c each. State number of patent and name of inventor when ordering.

Airship construction. Marshall R. Myers, Afton, Iowa. (No. 1,731,348.)

Parachute for flying-machines. Francis L. Grissom and John W. Garrett, El Paso, Tex. (No. 1,731,491.)

Pontoon nose buffer. Louis Haase, Manhasset, N. Y.; assignor to Fairchild Airplane Mfg. Corporation, Farmingdale, N. Y. (No. 1,731,492.)

Flying-machine. Severin C. Anker-Holth, Los Angeles, Cal. (No. 1,731,494.)

Aircraft. Edgar N. Gott, Bristol, Pa.; assignor to Keystone Aircraft Corporation. (No. 1,731,531.)

Airplane. Raymond B. Jackson, Los Angeles, Cal. (No. 1,731,666.)

Braking device for aircraft. Marion H. Aten, El Centro, Cal. (No. 1,731,735.)

Airplane. Else H. Tubbe, Brooklyn, N. Y. (No. 1,731,757.)

Gyroscope control system. Ferdinand G. Henry, New York, N. Y.; assignor to Fairchild Aerial Camera Corporation. (No. 1,731,776.)

Airship. Jegor I. Brown, Berlin-Charlottenburg, Germany. (No. 1,731,840.)

Aeroplane. Arthur H. Ross, San Leandro, Cal. (No. 1,731,910.)

Dirigible airship. Van E. Edwards, Washington, D. C. (No. 1,732,040.)

Aeroplane. Ole M. Peterson, Turner, Oreg. (No. 1,732,141.)

Landing-gear. William A. Aberg, Washington, D. C. (No. 1,732,209.)

Beacon. William R. Huntsman, Brookline, Pa.; assignor to B.B.T. Corporation of America, Philadelphia, Pa. (No. 1,732,363.)

Distribution of pulverulent material from aircraft. Hugo Junkers, Dessau, Germany. (No. 1,732,406.)

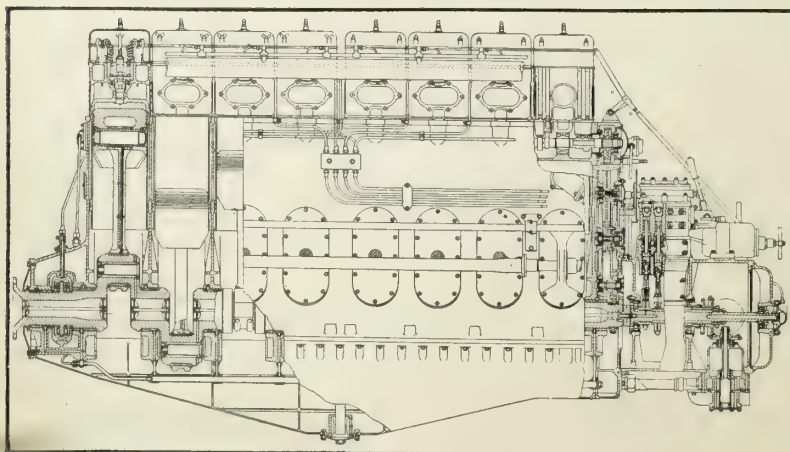
Airplane-launching appliance. Leslie R. McDonald, Montreal, P. Q. (No. 1,732,524.)

Brake-wheel for aeroplanes. Charles E. Sparhawk, Steilcoom, Wash. (No. 1,732,544.)

Aeroplane. Andrew Sedlmeier, Oakland, Cal. (No. 1,732,570.)

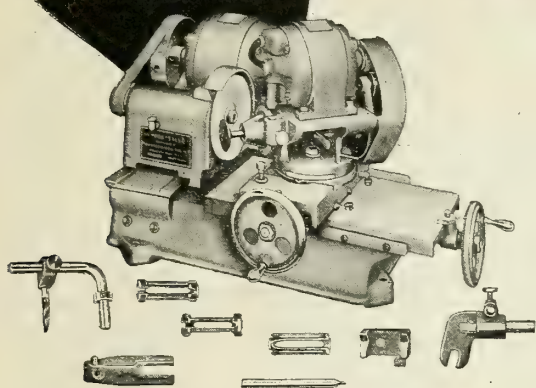
Aircraft control. Walter S. Diehl, Washington, D. C. (No. 1,732,642.)

(Continued on next page)



Longitudinal section of the British Beardmore Tornado heavy oil engine

# Wherever Motors are Serviced

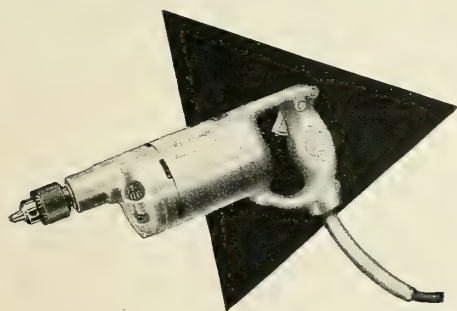


## VAN NORMAN "VALVO" VALVE REFACER

Accommodates all types of valves including the new flat head type. Will take very large stem diameters, large head diameters. Collets may be had to handle the valves in the Curtis 0x5 motors.

Can be used to resharpen any angle valve reseating cutters.

With a valve stem capacity of  $53/64$ ", two motors, special Van Norman Split-Double Grip Collet and a guarantee of accuracy within .001", the "Valvo" fulfills every demand for valve reconditioning work.



## STANLEY 1/4" STANDARD DUTY ELECTRIC DRILL No. 141-A

Designed for all kinds of rapid drilling or wire brush work. A real production Drill. Well balanced, powerful, fast (3000 R. P. M.) and designed to permit close quarter drilling. An ideal tool for factory or field.

First class motor reconditioning depends to a great extent upon a well equipped shop. It is interesting to note that more and more Van Norman—Stanley—Stanley-Atha equipment and tools are taking their places in well equipped shops.

The accuracy and general all around efficiency of these tools appeal to mechanics both in the factory and at the field.

Expert reconditioning of airplane motors can be done quicker, easier and more accurately by using Van Norman — Stanley — Stanley-Atha tools. We can prove it.

Complete catalogs of these lines will be sent upon request.

VAN NORMAN MACHINE TOOL CO.  
Springfield, Mass.



## STANLEY-ATHA "MASTER MECHANIC" KIT No. 0620

Assortment of twenty Chisels and Punches which will take care of any job. All made of electric furnace Chrome Vanadium steel.

# Van Norman

# STANLEY

# STANLEY-ATHA

Valve Refacers  
Piston Grinders  
Reamer Grinders  
Reamo  
Pilots and Cutters

Electric Drills  
Electric Bench Grinders  
Electric Screw Drivers  
Electric Aerial Grinders  
Hole Saws

Body & Fender Tools  
Chisels & Punches  
Hammers  
Screw Drivers  
Sledges



(Continued from preceding page)

Means for preventing airplanes from taking nose dives. Thomas C. Lutton, Evansville, Ind. (No. 1,732,758.)

Aeroplane. Loren L. Yock, Garber, Okla. (No. 1,732,873.)

Aeroplane. Morris D. Rosenbaum, Rochester, N. Y. (No. 1,733,030.)

Flying-machine. Henry Steigner, San Francisco, Cal. (No. 1,733,033.)

Radial internal-combustion engine. Paul L. Weiller, Paris, France. (No. 1,733,037.)

Gyroscopically-stabilized inclinometer. Helge A. Borresen, Chicago, Ill. (No. 1,733,109.)

System of airplane transportation. Julius Messer, Hempstead, N. Y. (No. 1,733,270.)

Wing-heater for aeroplanes. Daniel Morris, St. Petersburg, Fla. (No. 1,733,465.)

Parachute-deflating means. John M. Henry, Philadelphia, Pa. (No. 1,733,732.)

Airplane generator mount. Flavius E. Loudy, Cleveland, Ohio; assignor to Glenn L. Martin Co. (No. 1,733,891.)

Aircraft. Charles A. Wragg, Washington, D. C. (No. 1,733,928.)

Life-saving device for aeroplanes and ships. Peter Ballaz, West New York, N. J. (No. 1,733,932.)

Airplane emergency flotation-gear. Charles N. Monteith, Frederick G. Arnold and Robert J. Minshall, Seattle, Wash.; assignors to Boeing Airplane Co. (No. 1,733,973.)

Aeroplane. James G. Connor, Harrisburg, Pa. (No. 1,734,114.)

Aero propelling and steering means. Maurice Gallet, Poughkeepsie, N. Y. (No. 1,734,251.)

Helicopter. Frank R. Many, Cleveland, Ohio. (No. 1,734,263.)

Automatic launching device for airplanes. Elmer A. Sperry, Brooklyn, N. Y.; assignor to Sperry Development Co., Dover, Del. (No. 1,734,353.)

Cowling-pin. Charles N. Monteith and Frank A. Walloch, Seattle, Wash.; assignors to Boeing Airplane Co. (No. 1,734,526.)

Aeroplane-wing. Heinrich Freise, Bochum, Germany. (No. 1,734,801.)

Apparatus for landing airships. Otto Krell, Berlin-Dahlem, Germany. (No. 1,734,812.)

Turning error preventer for gyro-compasses. Leslie F. Carter, Leonia, N. J.; assignor to Sperry Gyroscope Company, Brooklyn, N. Y. (No. 1,730,967.)

Arrangement for mounting radiators in aeroplane-wings. Eugene M. G. Lepere, Paris, France. (No. 1,730,978.)

Aircraft landing. Harry C. Belleville, Oakland, Cal. (No. 1,731,091.)

Longeron for aeroplanes. Gianni Caproni, Rome, Italy; assignor to Curtiss-Caproni Corporation, Wilmington, Del. (No. 1,731,157.)

## SAVOIA-MARCHETTI HAS "RUMBLE SEAT"

WITH the addition of two seats in the rear of each hull of the Savoia-Marchetti S-55, much like the popular "rumble seat" in automobiles, the American Aeronautical Corporation has introduced a new feature in passenger accommodations for flying boats.

The approval of the Department of Commerce has been given this innovation. The rumble seats, which are enclosed with a clear vision cabin, afford passengers visibility to the rear, above and below. The seats face toward the tail and are reported roomy and comfortable.

The space required for the new rear cockpit was formerly utilized for storing passenger baggage, but despite the installation of seats there, ample provision is made for the specified baggage weight.

## DELIVERY BY 'CHUTE

A DEVICE for parachute airplane deliveries equipped with an automatic time release has been developed by the Aktiengesellschaft für Ausbeutung der Patente Künzer of Basle, Switzerland. The device permits loads to be dropped from heights up to 6,000 feet. It consists of a cylindrical aluminum shell containing precision clockwork and having an adjoining basket-like container with a folded parachute.

Before dropping the load the pilot sets the clockwork according to the altimeter. The altitude adjustment comprises a precision mechanism which dependently frees the parachute at the proper moment. The parachute remains closed as it descends toward the desired spot on the ground and opens at an altitude of 300 feet. The remainder of the descent requires 20 seconds.

The clockwork can be set and the parachute dropped by hand or by means of a special dropping gear which is designed to time and release five bags either singly or in any desired order.

# EMSCO MONOPLANE

## A Two-Place Sport Plane Powered With a Cirrus Engine

### Specifications

Span .....	35 feet
Chord .....	6 feet
Length .....	22 feet
Height .....	7 feet
Weight empty .....	1,090 pounds
Useful load .....	550 pounds
Gross weight .....	1,640 pounds
High speed .....	135 miles per hour
Cruising speed .....	100 miles per hour
Landing speed .....	38 miles per hour

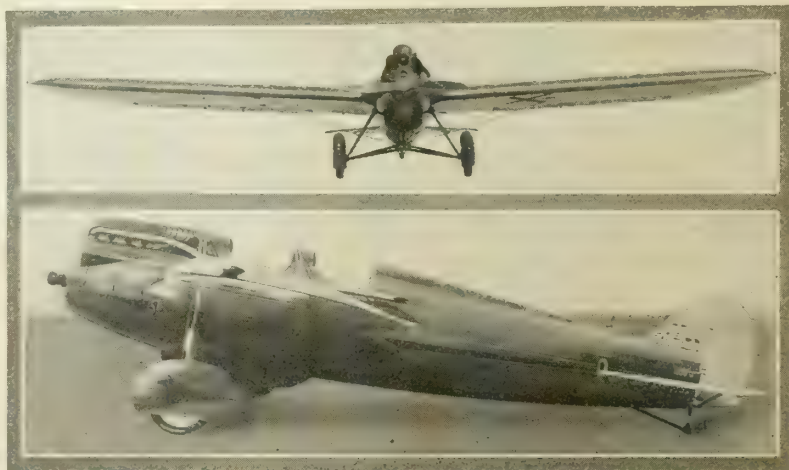
THE Emsco Cirrus is a two-place, mid-wing sport and training monoplane manufactured by the Emsco Aircraft Corporation of Downey, Calif. It was designed by Charles F. Rocheville, vice-president and general manager of the Emsco corporation.

The mid-wing structure of the Emsco Cirrus is unique and, according to the manufacturers, combines the stability of the high-wing monoplane with the slow landing speed of the low-wing type without sacrificing the advantages contributed when either type is used exclusively on a plane.

Particular attention has been devoted to streamlining in the design of the Emsco Cirrus, even to the landing wheels. The landing gear is equipped with Bendix brakes and Aerol shock-absorbing struts. The plane is designed to lend maximum visibility to the pilot and passenger from their cockpits above the wing. Pyralin covered openings in the fuselage, under the wing, afford the pilot a view of the ground.

The ship is powered with an American Cirrus engine of 95 horsepower. The manifold exhaust extends along the fuselage to a point aft of the pilot's cockpit. The gasoline capacity is 30 gallons and the oil capacity is 3½ gallons.

Standard equipment includes navigation lights, tachometer, altimeter, air speed indicator, oil pressure and temperature gauges.



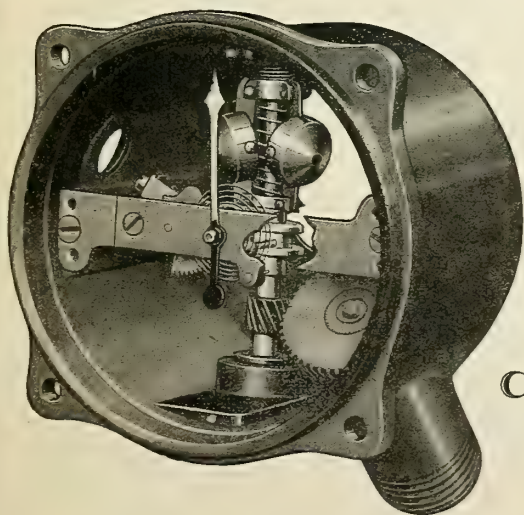
The Emsco Cirrus two-seater, which has a speed of 135 miles an hour

# CONSOLIDATED INSTRUMENTS



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No other Tachometer, save the new instrument of Friez, embodies the following assemblage of values.

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# CURTISS P-6 HAWK

THE Curtiss P-6 Hawk is a new pursuit plane recently completed for and delivered to the Army Air Corps by the Curtiss Aeroplane and Motor Company. The P-6 is a development of the Hawk pursuit planes previously used by the Army, but, with the exception of the tapered Hawk biplane wings, which are practically the same, it has entirely new characteristics. Superior performance has been obtained by the use of a Curtiss Conqueror engine and the new Prestone cooling system.

Reductions in weight and head resistance have resulted from the use of Prestone chemical liquid cooling, developed by the Engineering Section of the Army Air Corps at Wright Field, Dayton, Ohio. All Conqueror engines are equipped to use Prestone. The successful employment of Prestone has brought the weight of liquid-cooled engines down to that of air-cooled power plants.

Because of the small amount of Prestone required, in comparison to water, to cool the engine, the combined weight of liquid and radiator carried by the P-6 Hawk is 125 pounds less than that carried by earlier Hawks. The frontal area of the plane, because of smaller radiator surfaces, is reduced by forty per cent.

The P-6 Hawk has a high speed of 181 miles per hour, almost 25 miles per hour more than its predecessors, and a cruising speed of 145 miles per hour. Its stalling speed is 61.3 miles per hour, and it can climb at the rate of 2,170 feet per minute. The P-6 can climb 14,400 feet in ten minutes, and has an absolute ceiling of 24,400 feet.

The fuselage designed and constructed for the P-6 Hawk incorporates several improvements over the former Hawk. Chromemolybdenum steel has been substituted for carbon steel in the framework, effecting a considerable reduction in weight. The fuselage is fully faired and streamlined to increase the speed and efficiency of the plane. The single cockpit has been made roomier, and, among other changes, the gasoline tank has been moved to provide more leg room for the pilot. Another feature of the P-6 is a new oleo landing gear.

The Conqueror engine is of the "V" type and has twelve cylinders. It develops 600 horsepower at 2,400 revolutions per minute. The engine has a normal compression ratio, and uses domestic aviation gasoline, consuming 310 pounds of fuel and nine pounds of lubricating oil per hour with the throttle wide open. This engine was described in full in the February issue of *AERO DIGEST*.

The main gasoline tank holds fifty gallons, and the oil tank holds four gallons, giving the plane a cruising range at full throttle of 176 miles. At cruising speed, the range is increased to 272 miles. Fifty additional gallons of fuel may be carried in an auxiliary tank.

## Specifications

Span overall.....	31 feet 6 inches
Length overall.....	23 feet 1 inch
Height overall.....	8 feet 9 inches
Chord upper.....	62.6 inches
Chord lower.....	49.4 inches
Gap.....	53 5/16 inches
Stagger at leading edge.....	38 1/2 inches
Incidence upper.....	2 degrees
Incidence lower.....	2 degrees
Dihedral upper.....	0 degrees
Dihedral lower.....	1 1/2 degrees
Wing area (including ailerons)	252 square feet
Aileron area.....	13.3 square feet
Stabilizer area.....	32.9 square feet
Fin area.....	15.5 square feet
Elevators.....	14.8 square feet
Rudder.....	10.8 square feet
Wing loading.....	12.52 pounds per square foot
Power loading.....	5.25 pounds per horsepower
Airfoil section.....	Clark "Y" tapered
Load factor.....	12
Fuel consumption (full throttle)	310 pounds per hour
Oil consumption (full throttle)	9 pounds per hour
Fuel consumption (cruising)	160 pounds per hour
Fuel capacity (normal auxiliary).....	50 gallons
Oil capacity.....	4 gallons
Propeller diameter.....	8 feet 9 inches
Propeller pitch.....	14.5 degrees

Weight empty.....	2,430 pounds
Useful load.....	724 pounds
Crew.....	200 pounds
Fuel and oil.....	330 pounds
Equipment.....	27 pounds
Armament.....	167 pounds
Gross weight loaded.....	3,154 pounds

## Performance

High speed.....	181 miles per hour
Stalling speed.....	61.3 miles per hour
Cruising speed.....	145 miles per hour
Rate of climb.....	2,170 feet per minute
Endurance (full throttle).....	.97 hour
Endurance (cruising).....	1.87 hours
Range (full throttle).....	176 miles
Range (cruising).....	272 miles
Service ceiling.....	23,200 feet
Absolute ceiling.....	24,400 feet
Climb in 10 minutes.....	14,400 feet

## NEW WELDING ROD

THE Haynes Stellite Company of Kokomo, Indiana, has introduced a manganese-chrome-iron welding rod known as Hascrome. This is a self-hardening alloy, designed primarily for building up badly worn parts preparatory to surfacing them. Hascrome may be used for building up large sections of steel or cast iron, and forms an excellent base for Stellite because it is sufficiently hard to resist deformation under impact, and because of the ease with which Stellite flows onto it. Although in some cases Hascrome may be used alone for hard-surfacing parts subject to abrasive wear, it does not possess red hardness to the same degree as Haynes Stellite, and wears away more rapidly.

The oxy-acetylene process is considered best for the application of Hascrome, since the hardness of the deposited metal can be controlled by the amount of excess acetylene used in the welding flame, as well as by the rate of cooling. The greater the excess of acetylene in the flame and the slower the cooling rate, the harder the deposit will be. When quenched, the metal becomes softer and tougher. Hascrome is applied to steel without puddling the steel. Best results are obtained when the deposit is made just so the steel surface is at a "sweating" heat.



Single-seater Curtiss P-6 Hawk with 600-horsepower Conqueror engine has a speed of 181 miles an hour

# Simonds for Metal Cutting

—in the world's most exacting industry, Hack Saw Blades—(high speed and tungsten steel)—solid or inserted tooth metal cutting saws—files, metal cutting band saws

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*Simonds Hack Saw Blades at work in the Plant of the Sikorsky Aviation Corporation.*



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## B/J COMMERCIAL CABIN PLANE

**F**LIGHT tests have recently been conducted with the new B/J commercial plane. This plane, which is produced by the Berliner-Joyce Aircraft Corporation of Baltimore, Md., is a two-place tandem enclosed monoplane, and was designed primarily to incorporate a new wing arrangement that makes possible a greatly improved vision from an enclosed plane.

The unusual range of vision from the new B/J is obtained by mounting the wings below the top of the fuselage at the level of the pilot's eyes. The wings taper in thickness at the roof so that by a slight movement of the head it is possible to see in all directions. The entire enclosure from above a line at about the height of the pilot's waist consists of windows, including windows above the wings on the sides, and on top the full width of the fuselage. Forward, side, and door windows are of safety glass.

The ship is powered with a Kinner five-cylinder radial engine. The motor mount is of simple, rugged design and is readily detachable from the fuselage. This is accomplished by securing the mount to the fuselage by removable tapered pins. The plane has been designed to use higher horsepower if desired. The aluminum cowl is readily removable, giving access to the rear of the engine motor. Each cylinder is cowled to the rear, which not only increases the speed, but adds to the streamline appearance of the entire engine assembly.

An elliptical oil tank of  $4\frac{1}{2}$ -gallon capacity is mounted forward of the firewall in the engine compartment. A gauge for the oil tank is provided which also serves as a check against putting too much oil in the tank, allowing sufficient space for foaming. This gauge is accessible without removing

any cowl or doors. Exhaust stacks from the four cylinders lead into a streamlined collector ring discharging under the fuselage, the lower cylinder exhaust being led to the carburetor hot air stove.

Gasoline is carried in two wing tanks of fifteen-gallon capacity each, and feed is by gravity. The gas tanks are readily accessible and are equipped with individual gauges visible from the pilot's seat. A three-way valve is located directly below the instrument board.

The fuselage is a welded structure of chrome-molybdenum tubing throughout. The Warren truss system of construction is used, eliminating wire bracing and insuring maximum and permanent rigidity. The inside dimensions are generous, allowing freedom of movement and ready entrance and exit from two large doors. Both seats are removable, and provision is made for seat-pack type parachutes or cushions without altering the height of the sitting position. Side windows can be opened. The instrument board is of metal, securely fastened to the fuselage in front of the pilot and conveniently located both as to height and distance from the pilot's eye. A compartment for baggage is provided back of the rear seat. The greater part of the fuselage is fabric-covered, although sheet metal covering is employed on the sides to the rear windows and the forward half of the bottom.

Wings are of wood construction with fabric covering. Spars are of box type, made of spruce with mahogany plywood webbing and reinforced with stiffeners at each rib point. Ribs are of modified truss construction made up of spruce and plywood. In tests a rib weighing only eight ounces carried a gross load of 427 pounds without

breaking. Wood compression members and over-strength swaged tie rods comprise the drag system. All fittings are of steel, and spars are reinforced at fitting points to insure permanent rigidity and strength to the wing structure. Forward of the front spar, the wing is practically a tubular structure, which not only gives additional strength but also assures permanency of airfoil contour. This is accomplished by securing a duralumin sheet over the leading edge strip of spruce back to the top and bottom of the front spar.

Wing struts are of streamline chrome-molybdenum tubing, employing a unique truss arrangement which allows for small sized members and for supporting the spars at multiple points, thereby reducing concentrated spar stresses.

The landing gear is of the individual axle type, with streamline oleo struts supported to the wing strut assembly directly above. This arrangement, with a tread of over seven feet, gives ease of taxiing and freedom from ground looping, and is of sturdy but light construction.

Standard equipment includes Bendix wheels and brakes. A tail wheel equipped with pneumatic tire is used, and the load is absorbed by an oleo leg and toggle arrangement, the wheel being held in line with the longitudinal axis of the plane under tension. The entire tail wheel and shock-absorbing assembly is mounted externally of the fuselage, allowing practically a full swivel movement together with easy inspection and maintenance. All three oleo legs have a long stroke, permitting very easy landings.

All control and fixed tail surfaces are made of chrome-molybdenum steel tubing, fabric covered. The tail surfaces have a very high aspect ratio. The high aspect ratio of the control surfaces, together with improved design of the control gear, is said to provide excellent maneuverability and control. All tail surfaces are rigidly braced by streamline struts. Frieze type ailerons are employed. The stabilizer is adjustable in flight by a lever from the pilot's seat. A three-degree adjustment to either side of neutral position is possible. Brakes are actuated from the rudder pedals. Dual control is provided, the rear control being com-



The B/J plane, showing arrangement of tail surfaces and tail wheel

(Continued on next page)

# A Pioneer That Still Leads the Field

BY

E. B. GALLAHER

Editor, *Clover Business Service*

Treasurer, Clover Mfg. Co.

**M**akes a fellow feel old when he thinks back to the time that he joined a few friends and founded the Automobile Club of America—the time when he was making Horseless Carriages instead of Automobiles.

Then shortly afterwards to join another group in founding the Aero Club of America, when the sport consisted of balloon racing—long before the Wrights brought out their heavier-than-air machine.

And it was during this early period that the need for a reliable and better means of grinding valves and lapping working parts became apparent; for up to that time only ground glass and powdered emery were known in the shop.

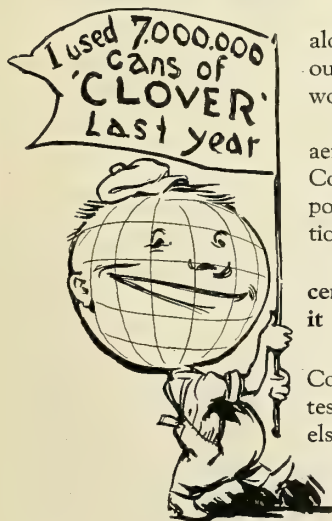
What was more natural, then, than to supply the need by inventing and patenting Clover Compound—a compound that actually cut ten times as fast, and, due to the wonderful binder, did a more perfect job than had ever before been dreamed of?

Clover Grinding and Lapping Compound—first, and for many years alone in the field—has grown with these two industries, until now its yearly output of some five million cans may be purchased throughout the civilized world.

And, wherever fine work is being done, whether it be in automobiles, aeronautics, in the machine shop or elsewhere, there you will find Clover Compound—as, for instance, Commander Byrd took only Clover Compound with him to the North Pole—and now on his South Polar expedition—for the upkeep and maintenance of his airplanes and other machinery.

Naturally, Clover Compound is better today than it was a quarter-century ago—the same as automobiles and airplanes are better—but, it is still the leader in its field, as it was at first.

I want you to try the new Grease-Mixed Compound—the kind that recent Government tests show to cut  $3\frac{7}{10}$  times faster than anything else. A free sample will gladly be sent.



*Gallagher*

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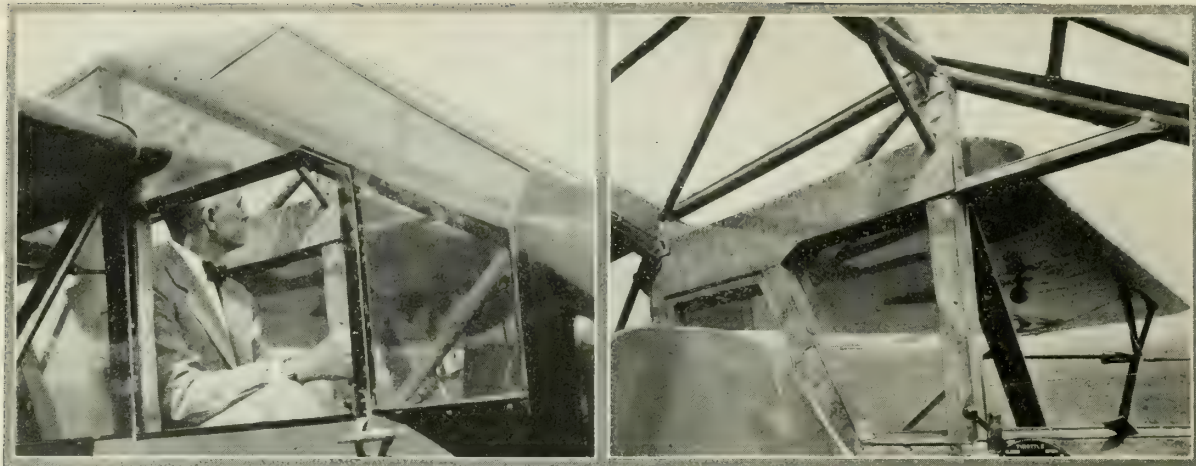
Clover WATER-MIXED Hi-Speed Valve-Grinding Compound . . .

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Exterior and interior views of the Berliner Joyce cabin plane, showing visibility afforded from the pilot's seat

(Continued from preceding page)

pletely removable when not required.

All appointments and fitting are of good quality and strength. Equipment is complete, including compass, air speed indicator, altimeter, tachometer, and wiring for navigation lights. All instruments are mounted on an attractively designed instrument board which is indirectly lighted.

The interior of the plane is finished and upholstered to match the general color scheme. The upper part of cabin is finished with aluminum sheet and inlaid hardwood mouldings.

Actual performance, with full load, obtained with calibrated instruments and data reduced to N. A. C. A. Standard Atmosphere, is as follows:

High speed.....150 miles per hour  
Stalling speed.....49 miles per hour  
Climb.....600 feet per minute  
Service ceiling.....13,000 feet  
Absolute ceiling.....15,000 feet

Further tests are being conducted to determine maximum performance with various propellers and settings.

## THE ARMSTRONG SEADROME

**W**ITHIN a few months, the Armstrong Seadrome, which is under going the final stages of construction in Delaware Bay, near Cape May, will be towed to a point between the United States and Bermuda and anchored there, making a stop for planes almost half way between the mainland and the Bermuda Islands. This seadrome, which is the first of a series planned for eventual construction, will be approximately 395 miles south and east of New York. The floating airport will be known as "Langley."

Edward R. Armstrong, consulting engineer of the DuPont Corporation, who obtained a leave of absence from that firm to superintend the construction of the seadrome from his own plans, declares in an interview to Paul W. White of the *American Magazine* that by July of 1930 one will be in operation.

Armstrong and his associates have gone

into the construction of seadromes on a purely commercial basis and they expect to operate them in conjunction with airlines of their own, reducing the time of travel between New York and Hamilton from forty-seven hours sailing time to six hours, thirty minutes flying time. This tentative schedule allows a half hour stop-over on the floating island.

The seadromes will be considerably more than mere emergency landing fields in mid-ocean or even refueling stations. They will include a hotel, machine shops and complete servicing and refueling facilities. The hotel will require a personnel of twenty or more, and in excess of thirty people will constitute the permanent crew of the island. The fare to Bermuda by plane is expected to be fixed at \$150 for the round trip, and Armstrong estimates that under full operation, the air service and the seadrome combination should earn nearly \$2,000,000 a year.

If the New York-Bermuda experiment works out as expected, the ultimate plan of the Armstrong group is to establish a nine-stop route from New York to Brest. Eight seadromes would provide stopping places and the other would be at Flores in the Azores. Then would follow the establishment of other lines, some of the seadromes serving as junction points.

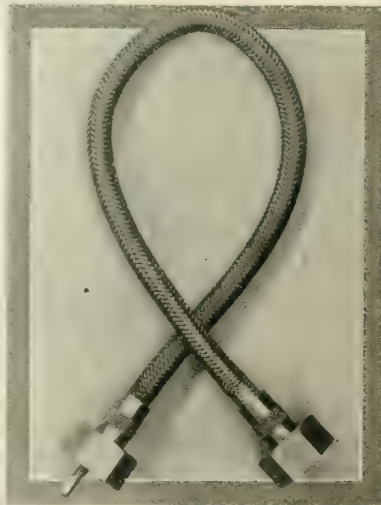
The first seadrome affords a platform 1,100 feet for landing, with a width of 340 feet in the center and 180 feet at the tapering ends. The whole structure weighs 28,000 tons and will be held in place by an anchorage system in 12,000 feet of water. The whole island will be steadied by thirty-two "legs" which will be fastened to ballast tanks loaded with iron ore. The structure will be 250 feet high and will protrude eighty feet above the water line. The island thus will not be subject to the pitch and toss of the sea. It may change direction with the wind, but must not have the side-to-side motion of ships.

Beam wireless will enable planes to locate the seadrome from a great distance in any kind of weather, and full illumination in clear weather will make it plainly visible for a considerable distance from the air as well as from the surface of the sea.

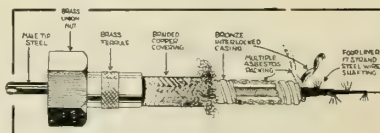
## NEW CONSOLIDATED TACHOMETER SHAFT

**A** NEW type of tachometer drive shaft is being introduced by the Consolidated Instrument Company of America, Inc.

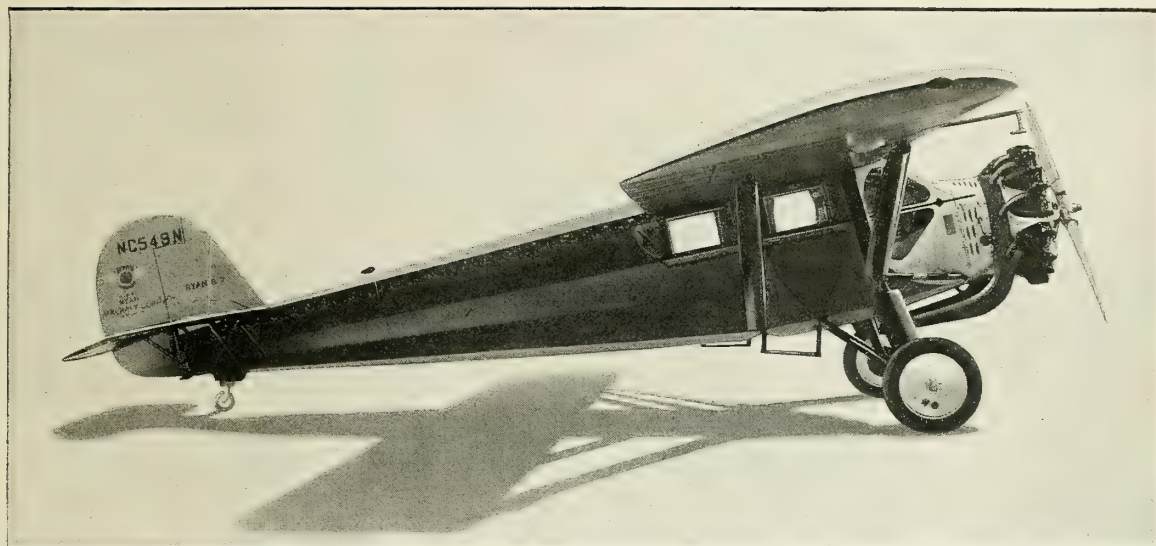
The new shafting, a patented and exclusive product of the company, embodies several improved features. The inner cable is constructed under a special process and consists of 17 strands of high carbon, high tensile strength music wire, in 4 layers. The casing, which is light in weight, is a bronze interlocked asbestos-packed section, reinforced with copper braided armoring. It has a natural bronze finish, with no japanning or lacquer to scale off. It is also very flexible and will permit of sharper bends, making installation handling easier.



Flexibility of Consolidated shaft



Details of the Consolidated drive shaft



# The NEW RYAN WASP BROUGHAM

## Lowest priced Wasp-powered cabin monoplane built today

Longer, speedier and more powerful, the new 6-place Ryan Wasp Brougham is the outstanding value in the aircraft field today. Never before has a Wasp-powered cabin monoplane been offered at so low a price.

Improved and refined the new model B-7 features greater stability—both directional and longitudinal. Powered by a 420 h.p. Pratt & Whitney Wasp—an engine of proved reliability—the new Ryan Brougham achieves a top speed of 150 m. p. h. with ease.

In a test flight from St. Louis to Milwaukee—



Department of Commerce Approved Type Certificate No. 262, including land gear and pontoons

a distance of 365 air miles—an average speed was maintained of 141 m. p. h. at 1650 r. p. m.

The new Ryan Wasp Brougham—with its cruising speed of 120 m. p. h.; 1350 ft. per minute climb;

and 9 seconds' take-off—has set a new standard of performance for cabin monoplanes.

Listing at \$16,900 it provides, at an attractive price, record-breaking Wasp performance combined with the world-recognized reliability of Ryan planes. Write for complete information on the new Ryan Wasp.

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# LIGHT AIRPLANES OF FRANCE

THE development of light planes in France has been comparatively recent and might be said to have been started after the development in other countries of light touring planes which have become popular among private owners. Previously, there had been very little activity in this phase of aviation in France, principally because of the economic condition of the country and lack of sufficient interest to warrant the exploitation of such planes. It seems apparent that the success of various well-known prototypes produced in both England and Germany has acted as an incentive to encourage the production and private operation of light touring planes in other European countries. In the case of France, the light airplane industry has been handicapped by what might be summarized as lack of sufficient interest on the part of the government and of the people. The number of private owners in France does not exceed fifty, though the population of the nation is 39,000,000, and it is conceded to be one of the wealthiest countries in Europe at the present time.

One might divide the French production of light planes into two general classifications. The first group consists of the well-established firms which have within the past few years undertaken the production of light planes, such as Caudron, Morane-Saulnier, Potez, Farman and others, and the second group is comprised of private individuals who have undertaken on their own initiative the construction of ships of their own design. In the case of the former, the large, well-organized and government-supported aircraft plants can afford to produce these small planes and spend money liberally towards selling expenses in order to create an interest and demand for their products as well as to popularize this form of aviation. The latter class of producers might be said to benefit indirectly from the efforts of the larger organizations, but on the other hand, they are not sufficiently backed financially in many cases to continue producing unless there is a good demand for their product. In view of the severe competition, their positions are often rather precarious unless their planes are of outstanding worth and are able to compete successfully against the larger and more powerful competitors. A number of French aeronautical societies have for some time been making efforts to encourage the production of new planes, and this year several new and interesting types have been

By Paul E. Lamarche, Jr.

brought out by individual designers, some of which seem to hold forth much promise from their all around aerodynamical qualities as revealed in their tests. It is ostensibly the aim of various French societies interested in this type of flying to design and produce outstanding planes such as are to be found in European countries which lead in the light airplane industry.

Certain of the light planes produced in France at the present time are outstanding and have won several records for altitude, speed, endurance and distance for planes of their class. There are available at present in France a number of excellent little planes which are very reasonable in price and which have good performance qualities. The industry has taken every opportunity to present its products before the public at every aviation meet of any importance. This form of propaganda, as well as the records and performances of the planes themselves, has reacted favorably in creating a greater interest in the use of the touring plane for sport and pleasure.

It is significant that, inasmuch as France produces several good engines suitable for this class of aircraft, it does not have to patronize a foreign market for power plants as do some of the other nations. Indeed, many of the French engines are exported to numerous countries and have stood up well under many gruelling tests. Among the most widely used are the Salmson air-cooled engines of varying horsepower ratings. Another radial type of air-cooled power plant which has gained considerable popularity is the Anzani. The new Renault four-cylinder in-line air-cooled motor is one of the most recent engine developments adaptable to light planes. Because it permits of better streamlining, the engine is destined to be quite popular, for it has already proved itself to be an efficient and dependable motor.

Practically all of the planes built in France are of wood construction and are monoplanes. In asking an engineer in a well-known aircraft factory why so much wood was used, I was informed that wood was preferred because it is cheaper and lighter than metal and because the replacement of broken parts is easier. It is also a fact that in France some of the larger aircraft factories use wood construction exclusively in building their larger planes for military and commercial use. The spruce

used for longerons and spars in most instances comes from the northwest of America and Canada. Although much spruce grows in northern and eastern Europe, American spruce is of a better quality and has in many cases proved actually cheaper to ship from America than to handle by freight from European points.

## Caudron

ONE of the older and more outstanding producers of light planes in France, is M. René Caudron, whose large plant just outside of Paris at Issy-les-Moulineaux, has for some time been engaged in the construction of a number of types designed for military, commercial and private use. At present Caudron is engaged in the construction of three types of light planes, known as the C-109, the C-192 and the C-193.

The C-109 is the earliest of these and was designed before the sudden increase of interest in light planes. It has on numerous occasions shown its worth in various competitions and has established several interesting records and figured in long-distance flights of importance. In 1925 the C-109 won four prizes in an international light airplane contest in Brussels. In 1927 it established a world record for distance in a straight line for planes of this category by flying 540 miles between Paris and Berlin. Later in the same year this little plane, as a single-seater, established a record by flying from Paris to Koenigsberg non-stop, a distance of 870 miles. It was used also by Mlle. Maryse Bastie when she established the women's endurance record.

The C-109 is a parasol monoplane built to accommodate a pilot and passenger. It is fitted with dual control. The high braced wing is built in three sections, the center section being attached to the fuselage by four vertical struts and the outer sections being braced by oblique struts of duralumin. The construction of the wing consists of two spars of rectangular tube and spruce ribs fabric covered. The fuselage, which is rectangular in shape, is constructed of wood with four spruce longerons and a normal number of cross pieces, the whole being covered by fabric. For power the Caudron C-109 is generally furnished with the Salmson 40 horsepower air-cooled motor which gives it a speed of 74 miles per hour. Its range is four hours on 13 gallons of fuel.

The C-192 and the C-193 are low-wing monoplanes and are very similar in construction, except for differences necessitated by the installations of different types of engines. Both of these prototypes have been produced this year and are among the newest of the light planes produced in France. Two of these took part in the recent *Challenge International de Tourisme*. The C-192 is built for an air-cooled radial engine and is generally powered with the Salmson 95 horsepower motor, whereas the C-193 is built for the in-line air-cooled motors: those which have so far been produced having been equipped with the new

(Continued on next page)



The Caudron C-109, a two-seater parasol monoplane

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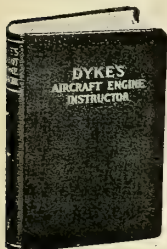


### AIRCRAFT ENGINE INSTRUCTOR

NEW EDITION

By A. L. Dyke

Oct., 1929



Size 6½ x 9½

Engineers from some of the best known companies assisted Mr. Dyke in the preparation of this great book, which covers modern aircraft engines and miscellaneous accessories and equipment, such as carburetors, magnetos, starters, generators, aeronautic instruments, etc. Adequate space is devoted to the Wright "Whirlwind," the "Wasp," Curtiss, Packard, Fairchild-Caminez (engine without crankshaft or connecting rods) and other leading engines, including some well known foreign makes. A very complete discussion of the Curtiss OX-5 engine with engine trouble-shooting charts included. Right up-to-date, including the construction and maintenance of metal (and wood) propellers, principle of operation of superchargers and rotary induction, discussions and illustrations of the "Cyclone," "Hornet," "Chieftain," "Challenger," Warner, Velie, Anzani, etc.

Practical, usable information is given on inspection for worn parts and locating troubles and what to do to correct or repair them.

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## AIR NAVIGATION and METEOROLOGY

By Capt. R. Duncan

Licensed Pilot U. S., Canada, France, England

3d EDITION

May, 1929

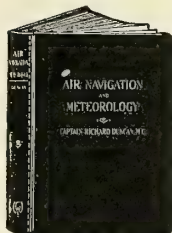
Here is a book that contains the exact information needed by a flier to become an efficient air navigator. To study the book and make the widest possible use of it, requires only the ability to read, write and use common sense.

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By J. B. Johnson, M. E.

PUBLISHED

Oct., 1929



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Between the covers of this timely book is packed every fact and every bit of information available today on the art of welding in aircraft design, construction and repair. It covers every method of welding—every type of weld—every weldable metal—in plain, every day language. It shows how welding enters into aircraft design—how ships are fabricated and built with welds—how repairs are made, and best of all—it shows you how to make all the different kinds of welds and how not to make them too, so you can't go wrong. The author has had a wide experience in actually doing and supervising the kind of work which he describes so well for you in his book. He has conducted experiments and made thousands of tests of various kinds. He has trained many men in the art of Airplane Welding, and is considered everywhere a real authority on the subject.

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(Continued from preceding page)

Renault motor. Both planes are cantilever low-wing monoplanes with accommodations for two. The wing is built up of two spars and the normal number of ribs, the whole being covered with plywood. The wings can easily be dismantled and consist of three sections, the center section being joined to the fuselage. The fuselage is robust in construction and has a frame consisting of spruce longerons covered with plywood. The engine mount is of hollow welded steel tubing, and the engine is attached by four bolts. The forward part of the plane has an easily demountable metal covering.

### Specifications

#### CAUDRON C-109

Span .....	37 feet 8 inches
Area .....	205 square feet
Length .....	21 feet 3 inches
Height .....	8 feet 4 inches
Weight empty .....	720 pounds
Useful load .....	332 pounds
Total weight .....	1,175 pounds
Range .....	4 hours
Speed .....	75 miles per hour

#### CAUDRON C-192 AND C-193

	C-192	C-193
Span .....	37 ft. 10 in.	37 ft. 10 in.
Length .....	24 ft. 7 in.	24 ft. 6 in.
Height .....	10 ft. 4 in.	10 ft. 4 in.
Carrying surface .....	126 sq. ft.	126 sq. ft.
Weight empty .....	970 lbs.	970 lbs.
Weight of fuel .....	378 lbs.	214 lbs.
Total weight .....	1,365 lbs.	1,184 lbs.
Fuel capacity .....	33 gal.	33 gal.
Oil capacity .....	4 gal.	2 gal.

### Albert

The Société Anonyme Avions Albert was formed in 1926 to build light planes. The company's plant is at Drancy, a small town near Paris. For some time it has been engaged in the construction of the Type T.E.I. monoplane, now known as the A-100, which has won records for distance, altitude and speed. The Albert ships have in many ways proved themselves exceptionally fine little planes because of their economical and practical flying qualities. At present, the Albert plant is engaged in building three different light planes known as the A-100, a single-seat monoplane with a 40-horsepower engine, the A-60, a two-place monoplane with a 60 horsepower engine, and the A-10, a three-place monoplane with an engine rated at 95-100 horsepower.



Roques-Lefolcalvez, type D.S., with 25-h.p. Salmson engine

In principle these types are the same, being entirely of wood construction and having cantilever wings supported by four short struts over the fuselage. The wing section is the Göttingen 424, which on the Albert planes is built up of two spruce spars and a normal number of ribs, and is covered with plywood. The fuselage is likewise constructed entirely of wood and covered with plywood. The ailerons on these planes are very long, and, except for the rudder which is controlled by wire, all control is by rods. The fuel supply is carried in the wing in two tanks. In the case of the A-100, its economy in operation is such that its hourly consumption at a speed of 62 miles per hour does not exceed 3 gallons of fuel. The newest Albert monoplane with an enclosed fuselage recently established a new French record for planes of this size by climbing to an altitude of 21,450 feet on July 9th of this year.

### Specifications

	A-100	A-60	A-10
Wing surface....	107.5 sq. ft.	175 sq. ft.	232.2 sq. ft.
Weight empty....	561 lbs.	880 lbs.	1,265 lbs.
Useful load.....	224 lbs.	506 lbs.	660 lbs.
Weight of fuel....	66 lbs.	110 lbs.	143 lbs.
Power .....	40 h.p.	60 h.p.	95-100 h.p.
Load per square foot .....	7.9 lbs.	8.1 lbs.	9.1 lbs.

### Roques-Lefolcalvez

An interesting little plane which was produced in France about a year ago, and which has clean lines conducive to speed, is the Roques-Lefolcalvez Type D.S. monoplane. This diminutive *avionette* is particularly adaptable to acrobatic flying but was pri-

marily designed as an *avion de tourisme*. It has been equipped with both Anzani and Salmson air-cooled engines of 25 horsepower and has a speed of 73 miles an hour and a range of 435 miles. The fuselage is well streamlined and has a frame consisting of five longerons, three principal and two secondary. The covering is of plywood, except for the front which is of metal. The wing section is thick and is of wood construction covered with plywood and built in one piece. It is easily demountable and contains fuel tanks on either side, each having a capacity of 7 gallons. Because of the small size of this plane, the wheels have been made quite large so as to permit easy maneuvering at airports.

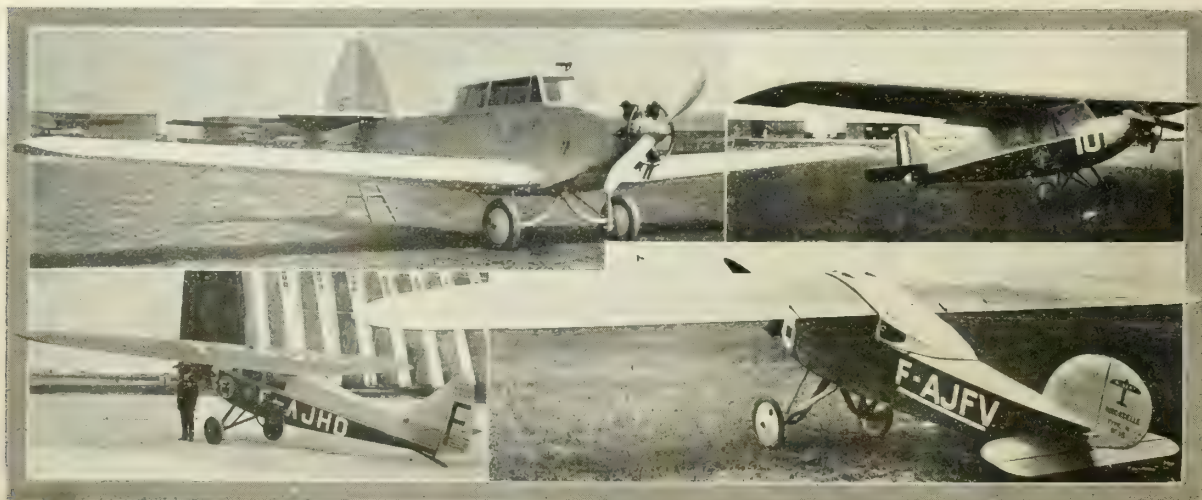
### Specifications

Span .....	26 feet 3 inches
Length .....	16 feet
Height .....	5 feet 5 inches
Wing area .....	116 square feet
Weight empty .....	415 pounds
Useful load .....	222 pounds
Hourly fuel consumption .....	1.8 gallons
High speed .....	73 miles per hour
Stalling speed .....	38 miles per hour
Cruising radius .....	435 miles

### Nessler

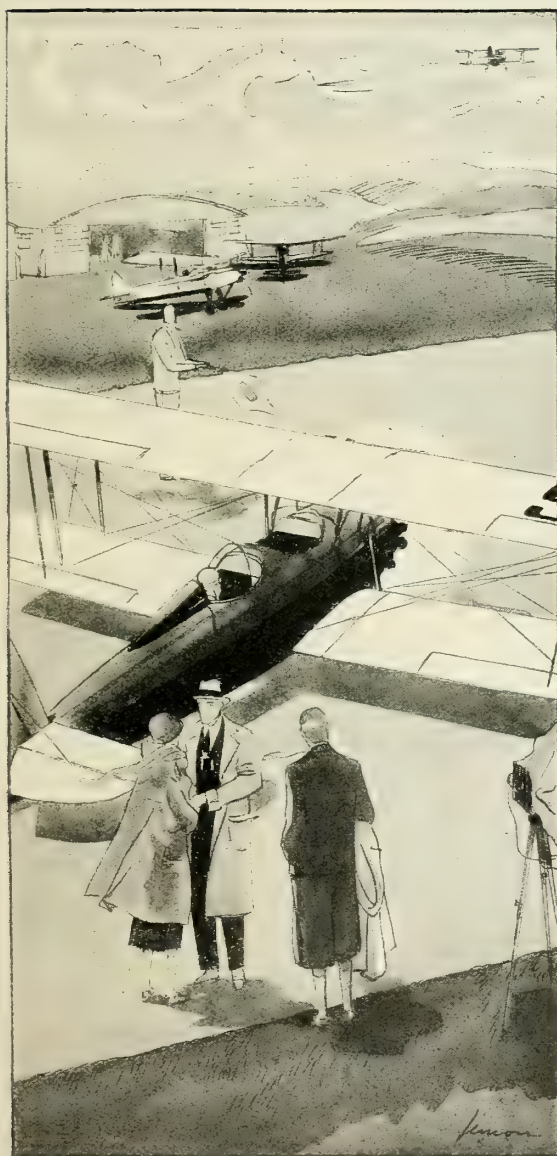
Another small monoplane of the *avionette* class is the Nessler "Libellule," which was built on the designs of M. Nessler by Louis Peyret, in whose plant a number of types for aeronautical engineers have been constructed. This little plane is unusual inasmuch as it is powered with a 12-horsepower

(Continued on next page)



Delanne (upper left), Guerchais (right); Guerchais, type T5 (lower left) and Albert, type R (right)

# NEW TRAFFIC LEAPS ALOFT AS COSTS COME DOWN!



**F**LYING, today, is a commonplace to thousands—a quicker, cleaner, healthier way of getting from here to there. And this increase is due to cuts in operating cost and the knowing use of good equipment.

The National Air Tour—for the trophy offered by Mr. Edsel Ford—gathered multitudes at every Airport and awoke them to the fact that airplanes operate steadily and economically—in good weather and bad just as the calendar gives it. Each plane covered more than 5,000 miles in 16 days . . . on schedule time.

“Whirlwinds” powered over half the planes on Tour this year. They won 1st, 2nd, and 3rd—70 per cent of all awards in fact! Yet this showing, under gruelling service conditions, is no more than an example of what thousands of “Whirlwinds” are doing . . . everywhere . . . every day!

To all men who use the air, Wright can say that with the new “Whirlwinds,” costs are coming down. The “high cost” bogey of flying is fading from the picture. To those who have not yet flown Wright urges that, with a licensed pilot and a licensed plane, they join the “First Flight Club” in confidence and comfort, behind a “Whirlwind” engine.



**WRIGHT**  
AERONAUTICAL CORPORATION  
PATERSON, NEW JERSEY







The Bourgois AT-1 (left) and the Farman (right) at rest and in flight

(Continued from preceding page)

Salmson engine and is able to take off when the engine is developing only seven. It is a single-seat parasol wing monoplane. The high wing is quite large, giving the little plane good gliding qualities. It is braced by oblique struts reaching to the bottom of the fuselage and the pilot's cockpit is directly under the wing. The plane weighs but 313 pounds when empty. The fuselage is constructed entirely of wood with plywood covering, whereas the wing is covered with fabric. The price of this little plane is 42,000 francs or \$1,680, but M. Nessler states that, with increased production, the price could be reduced to 35,000 francs or \$1,400.

#### Specifications

Span .....	34 feet 5 inches
Length .....	19 feet 7 inches
Height .....	6 feet 4 inches
Chord .....	6 feet 3 inches
Wing area .....	215 square feet
Weight empty .....	212 pounds
Total weight loaded .....	609 pounds
High speed .....	58 miles per hour
Stalling speed .....	24 miles per hour
Ceiling .....	11,500 feet
Cruising radius (4 gal. of fuel)....	248 miles

#### Farman

The Farman company's first notable attempt at producing a light plane for private ownership follows very closely in construction its larger and successful prototype

known as the F-190, which this year figured in two long-distance flights, one to Indo China and return, and another to Lake Tchad in Africa and return. The plant of the Société des Avions Henry and Maurice Farman is one of the largest in France and has for years constructed many large planes for military, as well as commercial, services. The plant is located at Billancourt, an outlying section of Paris, and the flying field and air school are located at Toussus-le-Noble, not far from Paris. The light plane, which is known as the F-200, in reality belongs to the heavier of the light planes, since it is powered with an engine of more than 100 horsepower. It is a semi-cantilever wing monoplane of mixed construction; wood, fabric and duralumin. It was introduced for the first time this year and has been displayed at several air exhibitions on the Continent, as well as at the London air show of last July.

The wing is in two sections joined at the center and attached by struts in the form of a triangle to the fuselage, allowing good visibility and ease in dismantling. Two oblique braces on either side extend from the outer sections of the wings to the bottom of the fuselage. The fuselage, which is rectangular in shape, is covered with plywood and contains two seats arranged in tandem, as well as a folding seat for a third person. The controls are dual. The landing gear is of the split axle type and is furnished with oleo-pneumatic shock absorbers. The plane

is powered with a 120-horsepower Salmson engine that is equipped with a self-starter. The fuel tanks, of which there are two, are placed overhead in the wing and have a capacity of 19 gallons each, giving the plane a radius of action amounting to 310 miles. The F-200 sells for 95,000 francs or \$3,800. Three months are required for deliveries. Wheel brakes, a metal propeller and other additional equipment can be added at extra cost.

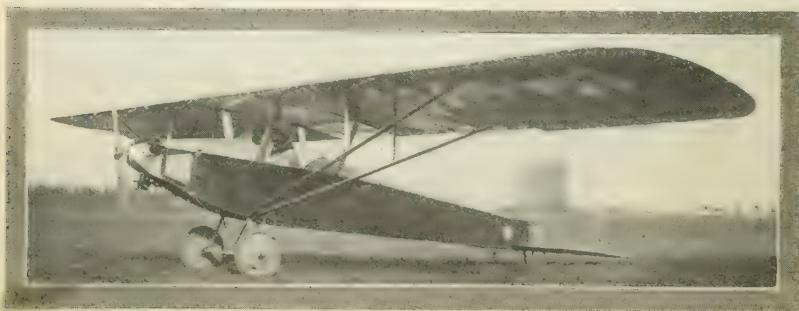
#### Specifications

Span .....	36 feet
Length .....	29 feet 6 inches
Height .....	8 feet 6 inches
Total wing area .....	268 square feet
Useful load .....	440 pounds
High speed (ground level) .....	96 miles per hour
Cruising speed .....	86 miles per hour
Radius of action.....	310 miles
Ceiling .....	10,150 feet
Fuel consumption .....	7.9 gallons an hour
Weight empty .....	1,340 pounds

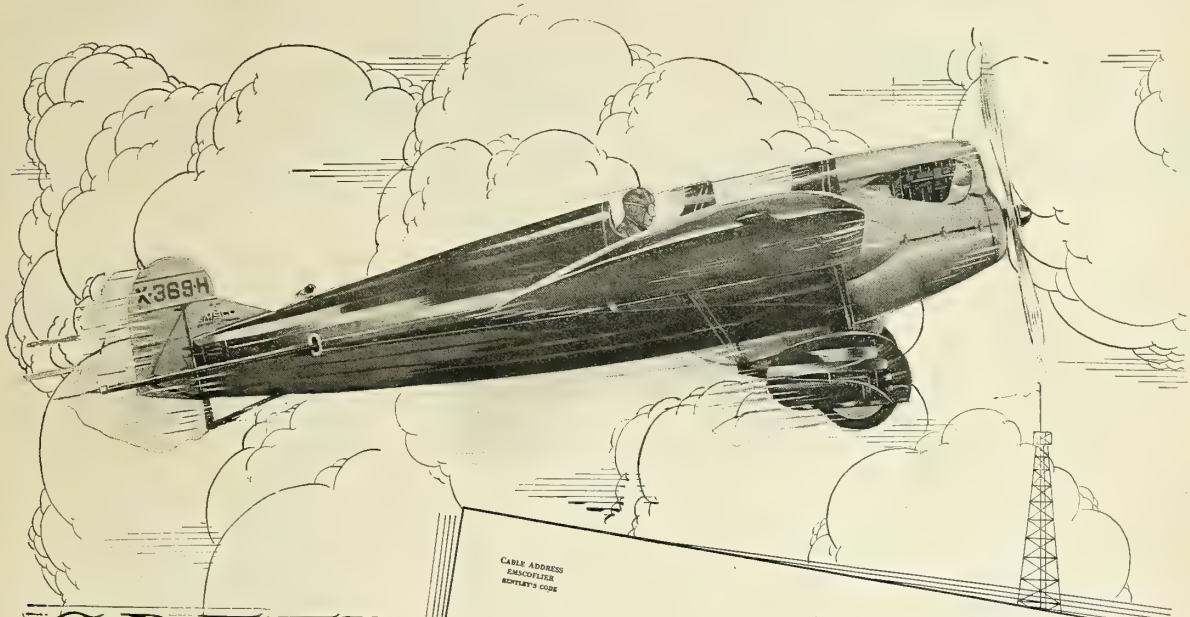
#### Mauboussin

One of the first of the newcomers in the light plane industry this year was Pierre Mauboussin, whose cabin monoplane was constructed in the aircraft works of Louis Peyret at Suresnes, near Paris. This plane was described in detail in the May issue of AERO DIGEST. Briefly, it is a cantilever wing monoplane of wood construction. The wing span is exceptionally wide in comparison with the short overall length and the tail units are also unusually large. The ailerons extend for nearly the entire length of the wing. All controls are actuated by rods and tubes. The Mauboussin Type 10, as it is designated, has exceptionally clean lines and is free from any external bracing or wires. The fuselage is of all-wood construction and is normally intended to accommodate one person, though provision can be made for a passenger. The fuel is carried in the wing, and the oil tank is behind the little 34-horsepower A.B.C. Scorpion two-cylinder air-cooled motor. It carries sufficient fuel for ten hours flying.

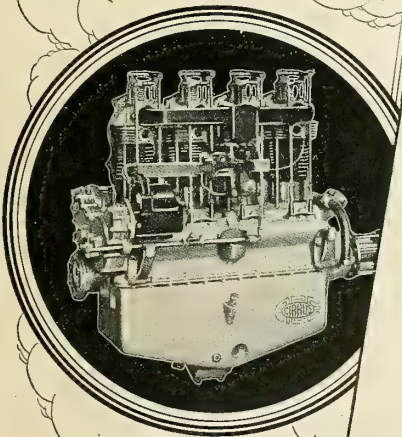
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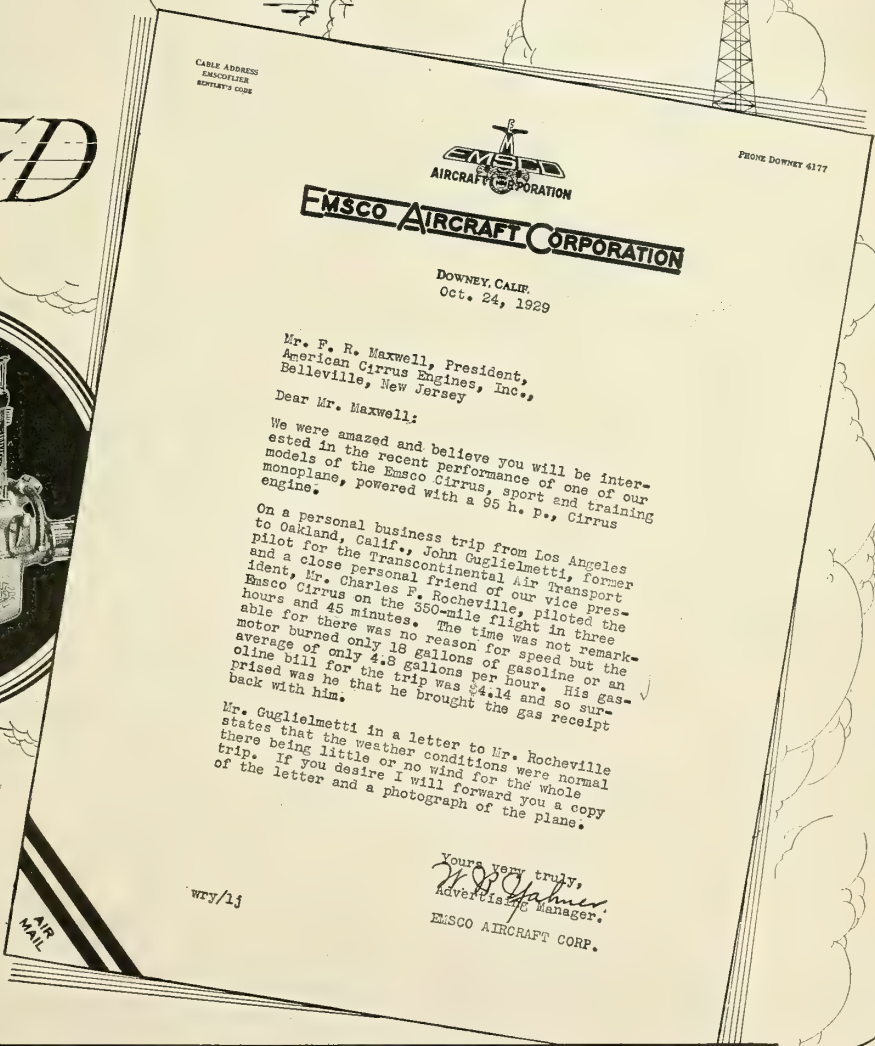
The Nessler monoplane with 12-horsepower engine has a speed of 58 m.p.h.



*SPEED*



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plane, because of its  
clean design and its re-  
liable power plant, has  
the remarkable top  
speed of 135 M.P.H.



**AMERICAN CIRRUS ENGINES, Inc.**  
**MARYSVILLE, MICHIGAN**





Two Caudron planes, one with a radial engine and the other with an in-line air-cooled engine

(Continued from preceding page)

The Mauboussin monoplane is one of several examples mentioned in this survey of light planes being built in France by private initiative.

#### Specifications

Span .....32 feet 9 inches  
Height .....6 feet  
Length .....14 feet 9 inches  
Total wing area .....107.5 square feet  
Chord .....4 feet 10 inches  
Weight empty .....407 pounds  
Total weight loaded .....748 pounds  
High speed (maximum) .96 miles per hour  
Ceiling (estimated) .....22,960 feet

#### Morane-Saulnier

Morane-Saulnier planes are well known and gained much recognition during the war. The company's large factory at Puteaux, near Paris, is now engaged in the production of a light plane, known as the MS Type 180, designed for private ownership. Like most of the Morane-Saulnier planes, the touring plane is a parasol wing monoplane and in this instance it has a semi-thick wing with considerable sweepback.

The Morane-Saulnier 180, a single-seater, is powered by the 40-horsepower Salmson engine which gives it a speed of 70 miles per hour. The wing is built in two symmetrical parts, being joined at the center over the fuselage. It is supported by two N-struts of hollow steel tubing. Oblique struts of duralumin tubing extending from the outer sections of the wing to the bottom of the fuselage form the rest of the wing bracing. The sweepback on this wing amounts to 15 per cent. The wing structure is mixed, the spars being of rectangular duralumin tubes and the ribs of plywood and spruce, the whole being covered with fabric. The frame of the fuselage consists of four longerons of spruce which are joined in front by metal frames. Except for the forward part, which is covered with metal, the fuselage is fabric covered. The cockpit is immediately behind the wing, and the seat is equipped with a device that permits the pilot to raise or lower it or move it forward or backwards

to suit his comfort. The fuel tank is placed behind the engine and is supported by the longerons of the fuselage. It has a capacity of 10 gallons which corresponds to three hours of flight at maximum speed. The landing gear is without axle and has a width of 6 feet 6 inches. The tail skid is steerable. The plane possesses a certificate putting it in the classification as being suited for acrobatic flying.

#### Specifications

Span .....29 feet 6 inches  
Length .....19 feet 8 inches  
Height .....7 feet 6 inches  
Chord .....4 feet 1 inch  
Total wing area .....141.6 square feet  
Total weight loaded .....957 pounds  
Wing loading .....6.9 lbs. per sq. ft.  
Power loading ....20.6 lbs. per horsepower  
High speed (ground level) 78 miles per hour

#### Potez

Another of the important aircraft manufacturers to enter the light plane field is the organization of Henry Potez, a noted builder of military and commercial planes, whose plant in the north of France at Meaulte employs more than a thousand men. The Potez plant this year produced a small two-seat cabin monoplane which is powered with a 60-horsepower Salmson air-cooled engine. Later, various changes in the engine mount were made to adapt it to the Renault four-cylinder in-line air-cooled engine. This new plane was presented to the public at the Vincennes meeting last June, and later two of them took part in the recent *Challenge International de Tourisme*.

In general, this new plane is similar in construction to the Potez 25, a successful military plane, about 2,500 of which have been built. The wing is in three sections, the center section forming a part of the fuselage. The two outer sections pivot about this section around the junction of the spars, allowing the wings to fold. The center section is covered with plywood and forms the roof of the cabin. The outer wing sections

are covered with fabric; spars and ribs are of wood construction. The folding of the wings is easily and quickly accomplished.

As constructed, the fuselage is divided into three parts in which different materials are used; the forward part where the motor is installed and the accessories and oil tank are housed, is of metal with a duralumin covering. The cabin is built up of four spruce longerons, the whole being covered with plywood. There are two seats placed side by side with dual control before them. Access to the cabin is by a small door on the right side. The after section of the fuselage is fabric covered and contains a small compartment for baggage. The tail assembly is constructed of spruce and plywood, each unit being covered with fabric. The stabilizer is adjustable on the ground. The landing gear is simple and wide enough to permit easy maneuvering on the ground. It is furnished with the Potez shock absorbing system. The price of the Potez 36 is 58,000 francs or \$2,320.

#### Specifications

Performances as given are for the Salmson 60-horsepower engine.

Span .....34 feet 3 inches  
Span (wings folded) .....13 feet 1 inch  
Length overall .....24 feet 7 inches  
Height overall .....8 feet  
Chord .....6 feet 6 inches  
Total wing area .....215 square feet  
Weight empty .....939 pounds  
Weight of fuel .....96 pounds  
Disposable load .....393 pounds  
Total weight loaded .....1,430 pounds  
High speed (ground level) 93 miles per hour  
Minimum speed (ground level)

37 miles per hour  
Ceiling .....11,800 feet  
Take-off run .....260 feet  
Landing run .....130 feet

#### Guerchais-Henriot

The Guerchais-Henriot is a three-place cabin monoplane powered with a 95-horsepower Salmson engine. This plane is com-

(Continued on next page)



Morane-Saulnier, type MS-180, and the Salmson-engined Potez cabin monoplane

# Solving Aviation's Passenger Comfort Problem



Before commercial Aviation could offer the public comfortable air travel they had to overcome two disturbing factors—*Sound* and *Vibration*. Aviation engineers experimenting with numerous materials, to solve this problem found they required the material to be light in weight, of great structural strength and to possess high insulation and isolation efficiency.

Genuine Lata Balsa wood—the only properly kiln dried and heat treated lumber solved this vital problem and it is now extensively used by the outstanding commercial cabin plane manufacturers engaged in passenger service for insulation, streamlining, fairings, trailing edges and struts. Ford All Metal Cabin planes are built with Lata Balsa panels surfaced on both sides with fire proofed duralumin veneer. The cabin interiors of Boeing transports are insulated with Lata Balsa mahogany plywood panels to overcome the sound and vibration of the three motors.

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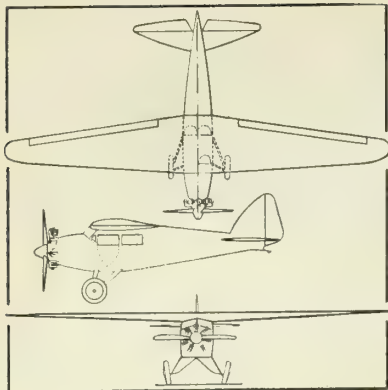
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# LATA BALSA WOOD

THE WOOD OF LITTLE WEIGHT AND MANY USES

# LATA BALSA WOOD





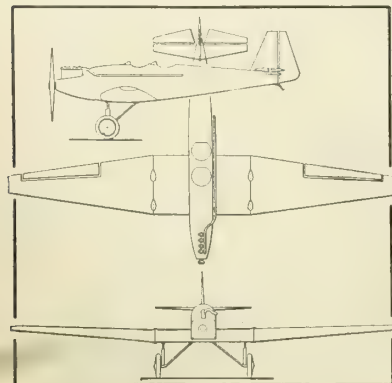
Guerchais et Henriot, type 5

(Continued from preceding page)

paratively new among the heavier of the light planes. Because of its speed of 93 miles per hour and its accommodations, it promises to be a popular touring plane. It is privately built by Messrs. Guerchais and Louis Henriot in St. Cloud, a suburb of Paris. The former is an aeronautical engineer and the later is connected with the firm of the same name which manufactures carburetors for airplane engines. The plane took part in the recent *Challenge International de Tourisme* and attracted much attention. In this contest and the Tour of Europe, the Guerchais-Henriot finished 25th out of the 46 which started and won 93 points out of a possible 165.

The plane is of all-wood construction and has a wing of one piece that is secured to the fuselage by six bolts and which may be dismantled in ten minutes. The spars are of spruce, and the wing is covered with plywood. Fuel tanks in the wing are large enough to permit a flying radius of 560 miles. The fuselage is of all-wood construction being built of six spruce longerons, and like the wing, covered with plywood. The control is dual. The plane complete with a Salmson 95-horsepower engine sells for 99,800 francs or \$3,992.

A similar, though smaller, type built for two has also been constructed by this company and is known as the Type 2. Like the larger plane, it has a cantilever wing and is of all-wood construction. It is furnished with dual control and is offered as a training cabin plane. It is powered with air-cooled engines ranging from 45 to 80 horsepower



Caudron C-190 with in-line engine

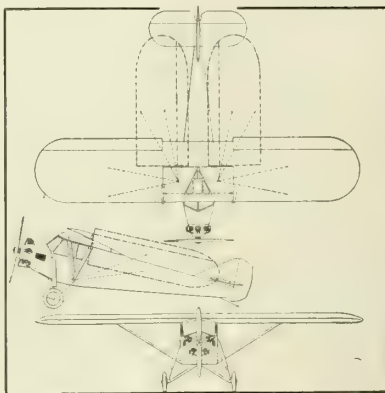
and has a maximum speed of 93 miles per hour. The radius of flight amounts to 280 miles. Equipped with a 60-horsepower Salmson engine, the plane sells for 80,850 francs or \$3,634.

Guerchais and Henriot also are building a small single-place monoplane of all-wood construction, which is usually powered with a 40-horsepower Salmson engine, and which when so equipped sells for 60,000 francs or \$2,400. The parasol wing is of the cantilever type covered with plywood and built in one piece. The fuselage of this Type 3, as it is designated, is covered with plywood and is well streamlined. It has a maximum speed of 93 miles per hour when equipped with the Salmson 40-horsepower engine.

#### Specifications

Performances given here are with a 60-horsepower Salmson engine and equipped as a two-place plane.

Span .....39 feet 4 inches  
Length .....22 feet 7 inches  
Height .....7 feet 6 inches  
Chord .....4 feet 10 inches  
Weight empty .....880 pounds  
Useful load .....506 pounds



Potez 36 folding wing cabin plane

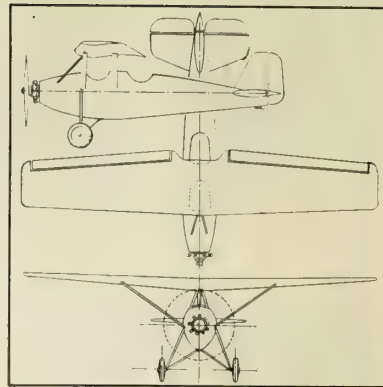
Wing loading ...7.1 pounds per square foot  
Power loading ...27.5 pounds per horsepower  
Maximum speed .....93 miles per hour  
Radius of action .....370 miles

#### Muniz

A new low-wing cabin monoplane known as the Muniz M-5, and powered with an Hispano water-cooled motor of 100 horsepower, has just been completed but at this writing it remains untested. Its lines are very clean, especially the forward section, which offers streamlining possibilities by reason of an engine in block rather than a radial engine. The new plane was designed by M. le Commandant Muniz, a Brazilian who has been connected with the Caudron plant in the construction of this plane.

#### Specifications

Span .....39 feet 4 inches  
Length .....23 feet 7 inches  
Height .....7 feet 6 inches  
Wing area .....193.5 square feet  
Weight empty .....990 pounds  
Cruising speed .....114 miles per hour  
Ceiling .....21,300 feet  
Radius of action .....5 hours  
Maximum speed .....127 miles per hour



Bourgois AT-1 parasol

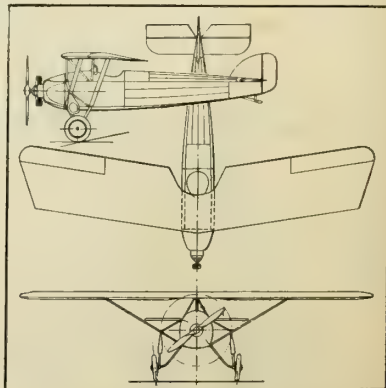
#### Bourgois

The Bourgois is another example of a light plane constructed in France by private initiative. This little machine, which is of unusually clean design, was first presented last spring at the aero show in Geneva where it created much favorable interest. The Bourgois was designed by Senemaud, an aeronautical engineer of some note. It was constructed in the body building works of M. Bourgois at Levallois, outside of Paris. It is a parasol thick-wing monoplane of all-wood construction, the wing and fuselage being covered with plywood. The wing has considerable dihedral and is constructed with spars and ribs of wood. The fuel tank, which is large enough to give the plane a radius of 370 miles, is contained in the wing. The fuselage is well streamlined and is oval in shape. The ship has accommodations for two and is furnished with dual control. Access is gained by doors on the right side. The forward part is enclosed by duralumin following the lines of the fuselage. This covering can be easily removed so that motor accessories are readily reached. The Bourgois plant has been enlarged since undertaking the construction of light planes and a new Bourgois light plane known as the Type B.T., a three-place low-wing monoplane with an 80-100 horsepower engine, is now being built there.

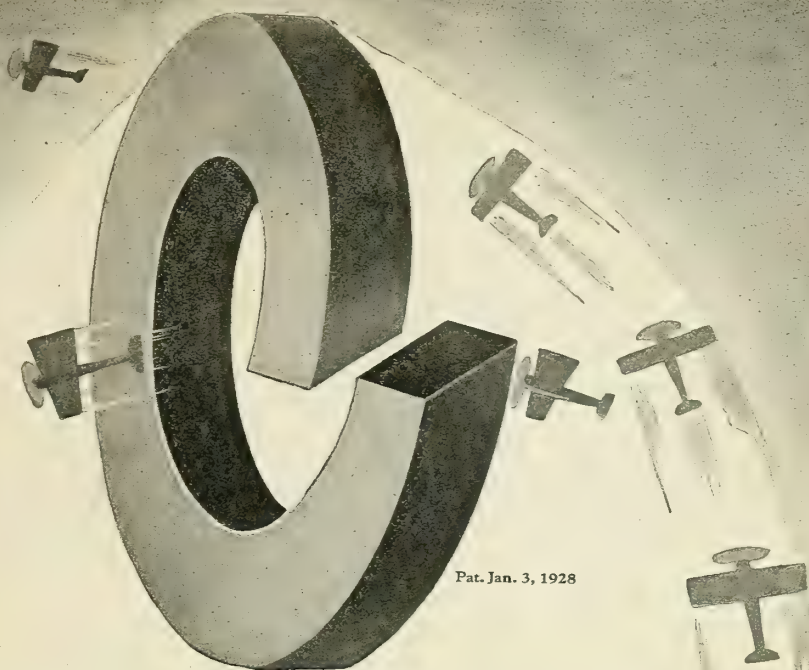
#### Specifications

Span .....29 feet  
Length .....20 feet 10 inches

(Continued on next page)



Morane-Saulnier, type MS-180



Pat. Jan. 3, 1928

## LEADERS IN THE MANUFACTURE OF AIRPLANES AND PARTS USE KANTLINKS

**A**FTER careful and thorough tests Kantlinks have been adopted by leading manufacturers. This is true not only in the airplane field but in many other industries.

They do not interlink or tangle. They do not rust, and they have greater holding power.

Kantlinks cost more than plain coil lock washers but they are worth more and are being used more widely each month.

Prices and full information will be sent by any one of the manufacturers listed below.

Made and sold under license  
by the Kantlink Manufacturers:

The American Nut & Bolt Fastener Co.  
Pittsburgh, Pennsylvania

Beall Tool Co.  
East Alton, Ill.

The Mansfield Lock Washer Co.  
Mansfield, Ohio

The National Lock Washer Co.  
Newark, N. J., Milwaukee, Wis.

The Positive Lock Washer Co.  
Newark, New Jersey

The Reliance Manufacturing Co.  
Massillon, Ohio

# KANTLINK SPRING LOCK WASHERS

TRADE MARK DO NOT TANGLE DO NOT RUST

THEY PAY THEIR ENTIRE COST IN TIME SAVED - SOMETIMES EVEN MORE



(Continued from preceding page)

Height .....	8 feet 7 inches
Chord .....	4 feet 9 inches
Wing area .....	138 square feet
Power .....	40 horsepower
Weight empty .....	660 pounds
Useful load .....	440 pounds
Total weight loaded .....	1,100 pounds
Wing loading .....	7.8 pounds per square foot
Power loading .....	27.5 pounds per horsepower
Maximum speed .....	96 miles per hour
Cruising speed .....	77 miles per hour
Ceiling .....	11,500 feet
Cruising radius .....	372 miles

### Delanne

The Delanne, another example of a light plane built by private initiative, is a new low-wing cabin monoplane built for the 60-horsepower Salmson or 70-horsepower Anzani motor. Delanne, its designer, worked with M. Girault, an engineer of the Aeronautical Institute of St. Cyr, in conjunction with the firm of Etablissements Letord in bringing about the construction of this new plane, which was first demonstrated to the public at Orly this summer. Like many others constructed in France, this ship em-

plains plywood exclusively in its construction. It has an enclosed cabin seating two, side by side. The wing is of thick section with some dihedral and is entirely free of external bracing. The spars and ribs are of wood construction. The wing is divided into three parts, the center section being a part of the fuselage and the outer sections being easily demountable. The cabin is accessible by a door opening from the right side, and its roof can be opened in an emergency so as to allow the use of a parachute. Because of its clean lines this little plane should prove to be fast.

### Specifications

Span .....	44 feet 3 inches
Length .....	25 feet 3 inches
Height .....	7 feet 4 inches
Chord .....	7 feet 2 inches
Weight empty .....	1,100 pounds
Useful load .....	1,650 pounds
Wing loading .....	7.6 pounds per square foot

### Performance (calculated)

High speed .....	89 miles per hour
Landing speed .....	34 miles per hour
Ceiling .....	13,120 feet
Cruising radius .....	5 hours

## HOW TO WELD DURALUMIN

**D**URALUMIN comes in the normal grade known commercially as 17S and also the three modified grades A 17S, B 17S, and C 17S, which have been developed to meet certain special requirements. The normal composition 17S contains a minimum of 92 per cent aluminum, 4 per cent copper,  $\frac{1}{2}$  per cent each of magnesium and manganese, and small quantities of iron, silicon, and other elements.

The strength and other desirable properties of duralumin are obtained only by correct heat treatment which is carefully carried out in the manufacturing processes. The heat-treatment consists of heating to approximately 900° F. and quenching, usually in cold water. After this process a change takes place in the properties of the duralumin which is peculiar to strong aluminum alloys. Immediately after quenching the metal is soft but its hardness and strength increase, at first quite rapidly and then more slowly, during the next four or five days. This change is called "ageing." Hot working followed by cold working either before or after the heat treating gives added strength to the material, the maximum improvement resulting only after the material has been fully wrought. The tempered commercial normal grade of duralumin has a tensile strength of from 55,000 to 63,000 pounds per square inch. Strengths run as high as 63,000 to 73,000 on the special C 17S alloy. The ductility of the metal decreases with the gain in tensile strength.

The properties of duralumin are due to four features of its manufacture; first, the composition; second, the heat treating; third, the "ageing," and fourth, the working.

In order to weld duralumin successfully these four processes must be taken into consideration and steps taken as far as possible in the actual welding which will either parallel these steps taken in manufacture or will avoid making any change in the metal or in its properties which cannot be fully restored by subsequent heat treatment or working. It is practicable to apply welding to joints in duralumin stock provided care is taken in the design to facilitate welding, to avoid difficult and complicated joints, and to take care of expansion and contraction of the metal. Provision should also be made for heat treating the entire part after welding if it is of a size which can be accommodated in a heat treating furnace.

In preparing duralumin for welding it is first cleaned as thoroughly as possible and coated with sheet aluminum flux which is mixed with water to form a creamy fluid. This is applied to the top and bottom sides of both edges to be welded or to the welding rod. The coated areas should be about  $\frac{1}{2}$  inch wide on each side. If possible, some sort of jig should be used to hold the parts in line. Some backing up material is also helpful for supporting the seam. Butt welds are recommended in preference to joints and beveling of the edges is not necessary.

In making duralumin tanks, flanged joints can be used but tack-welding should be avoided, the seam being carried out to completion in one operation. The sheets to be welded may be beaded or corrugated parallel with the seam about one to two inches from the weld, to allow for expansion and contraction.

Sheet duralumin should be spaced  $\frac{1}{4}$  inch per foot of seam. The tip or welding head used in the oxy-acetylene welding blowpipe should be one size larger than that used for the same thickness of steel. This will permit using a flame which will be hot enough and

at the same time will not be too harsh; high pressures and small tips should never be used.

Excellent results in welds in duralumin can be gained by the use of a welding rod containing about 5 per cent silicon. This rod is available commercially. It has a lower melting point than duralumin and, consequently, solidification takes place in the weld slower than in the fused portion of the base metal. The weld metal thus absorbs any stresses set up in the weld on cooling. A sufficient quantity of aluminum-silicon rod should be well cleaned and coated with flux before the welding is started so that the weld can be completed without stopping even momentarily. A stop can be made if absolutely necessary, but it is always best to complete the welding without interruption, since this results in a more even distribution of the heat.

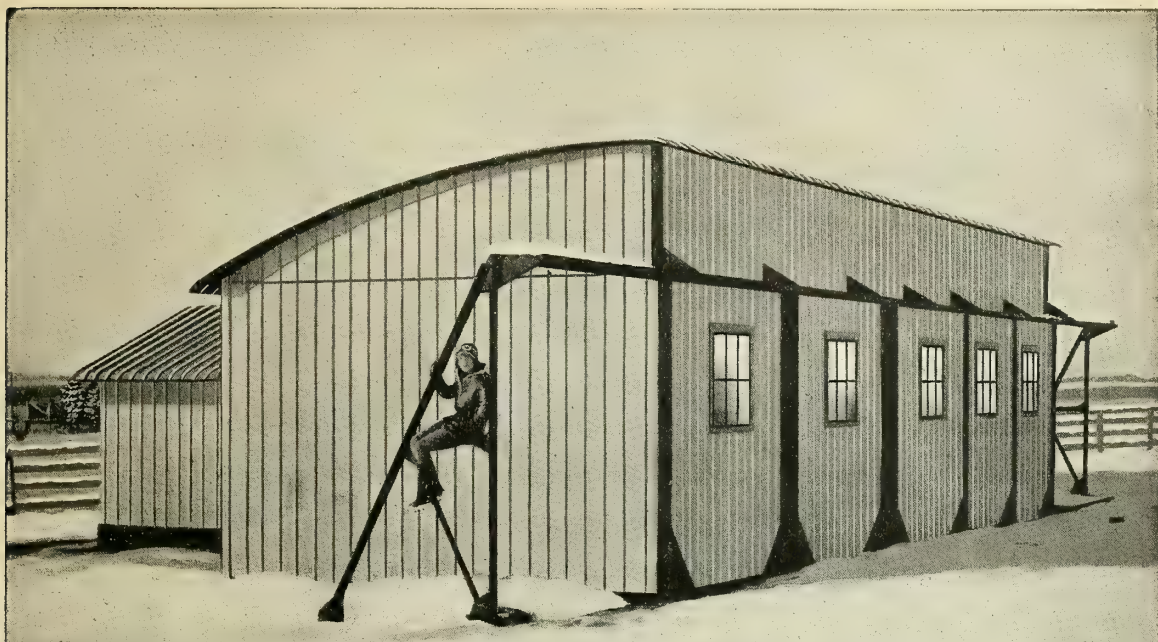
In starting to weld, the edges of the duralumin base material and the welding rod should be brought to the melting point at the same time. When the metal becomes molten the rod should be applied. The blowpipe is given semi-circular motion, working the flame around the rod. The blowpipe tip should be inclined slightly in the direction in which the weld is progressing, thus pre-heating the parts a little ahead of the actual puddle. Enough care should be taken so that no re-welding is required. Welds should be well reinforced. After the material is welded all flux should be thoroughly washed off with hot water.

For the best results the entire part should be heat treated after welding. That is, it should be placed in a suitable furnace, heated to a temperature of 800° F., to 940° F., and then quenched in cold water or oil. The time of heating may range from 15 minutes to an hour, depending on the method of heating and the size of the article. When no heat treating can be done the weld can be allowed to cool in air, but a joint of the strength obtainable with proper heat treating cannot be expected in these cases.

Joints made in duralumin without heat treating should be protected from moisture with spar varnish or some other protective material. This will improve the efficiency of the joint by preventing corrosion. Neither gasoline nor benzol has any noticeable corrosive effect on welded duralumin even though there may be considerable sulphur in the liquid.

The tensile strength which can be expected of welds made in duralumin varies with the methods used in heat treating and quenching but, in general, carefully made welds, cold water-quenched after heat treating, show an average tensile strength of over 43,000 pounds per square inch. Air quenching after heat treating, although not quite so efficient, can produce tensile strengths of over 40,000 pounds per square inch, in carefully made welds. Welds which are not heat-treated cannot be expected to attain much greater tensile strengths than 25,000 to 30,000 pounds per square inch.





# WINTER QUARTERS FOR THE PRIVATE SHIP

**W**INTER will soon be sending its heavy skies, its snow, ice and sleet to clip the wings of aviation. Most days will be ground days for the private ship.

Before winter comes, there is still time to provide winter quarters — protection against the elements, against fire, against tampering.

Butler Hangars are ready-made of prime quality steel shaped to secure the greatest strength per pound. Every unit is formed to template and matched punching facilitates bolting accurately in position. Erection is so simple and easy that one man can do it.



Butler Individual Ready-made Hangars are made in sizes suitable for all ships and with round or gable roofs. The Butler 3-in-one hangar also has a

garage and a work room in connection.

A new booklet pictures installations of Butler individual and commercial airport hangars. Butler engineering service will supply full information and prices if you will mention the size building in mind.

## BUTLER

READY-MADE  
HANGARS

**BUTLER MANUFACTURING COMPANY**

1234 Eastern Ave.  
Kansas City, Mo.

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Minneapolis, Minn.





# SPERRY AUTOMATIC PILOT

**T**HE automatic pilot has arrived. Nearly sixty hours of flight-testing in all kinds of weather have demonstrated the ability of a gyroscopic stabilizer developed by Dr. Elmer A. Sperry, and his son, Elmer A. Sperry, Jr., to fly more accurately than even a seasoned pilot. The new device has been christened the "Mechaviator" by a recent announcement of the War Department as a tribute to its ability and reliability so far demonstrated.

Trips between New Bedford, Mass., New York City and Wright Field, Dayton, and Detroit prove that the device will carry on hour after hour. The recent tests were made in a Ford transport plane of the Army Air Corps piloted by Lieut. Albert F. Hegen-

cuits in which are mounted three pairs of electro-magnets. The making of a contact energizes one of the electro-magnets, which, in turn, operates a small clutch connected with the particular control which will return the plane to normal flight.

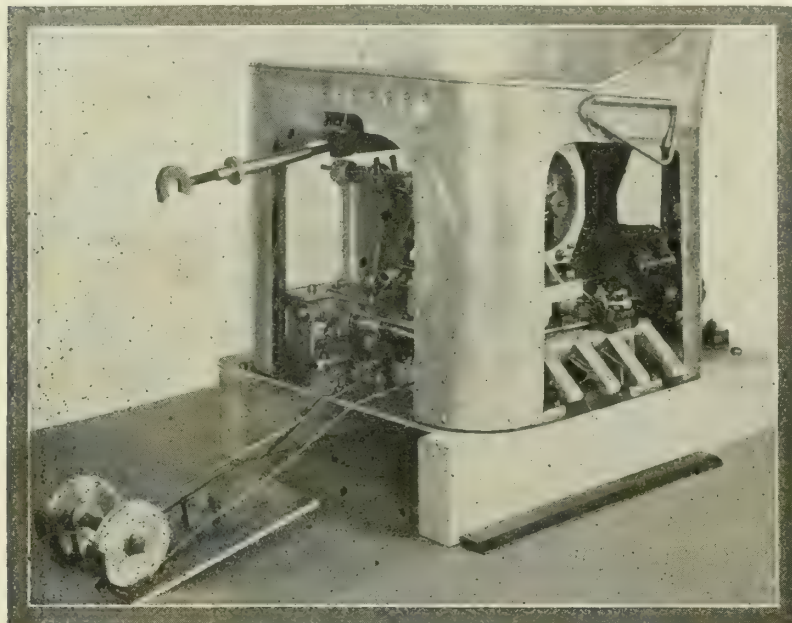
The power required is provided by an externally-mounted wind-driven electric generator. Power is supplied by means of a flexible shaft from the generator shaft, which provides mechanical power as well as electric power for the gyroscope. When, due to bumpy air or other causes, the plane assumes an abnormal attitude the gyroscope maintains its vertical position, and the airplane moves a few degrees around it, making a simple electrical contact which closes the

operator by means of a switch which breaks the electrical circuit, or, mechanically, by throwing the gears into neutral. Any one, or all, of the three major controls may be thrown out of action instantly to permit the pilot to take charge and fly in the usual manner.

The purpose of the automatic pilot is merely to control an airplane in straight and level flight and to hold it on a given course. The take-offs and landings in the present stage of development must be made by a trained pilot. As changes in the direction of the wind are encountered throughout the trip, the compass course must be changed accordingly, in order to maintain a true course between two given points on the ground.

The automatic pilot gives promise of being a useful instrument in the handling of large airplanes, relieving the pilot of much of the strain of straight and level flying, and giving him, as a result, the opportunity of devoting more of his attention to maps, navigation, and the action of his instruments. The new mechanical pilot will be of great usefulness in flying an airplane through regions of poor visibility. In military aeronautics the automatic pilot would be of considerable advantage for use in long-range bombing airplanes. The stabilizer will be an aid to aerial photography due to its smooth flying qualities and ability to fly in a straight line. As the size of airplanes increases automatic pilots will be more and more a necessary part of their equipment.

For over eighteen years the Sperry company has been interested in this development. In 1912 the first model, known at that time as the "Sperry Gyroscopic Stabilizer," was installed in a Curtiss flying boat and flown by Lawrence Sperry and also, in 1914, by Shiras A. Blair, an electrical engineer now a captain in the Army Air Corps at Wright Field. For the next three years Capt. Blair assisted Mr. Sperry in necessary research and experimental work. In 1914, Lawrence Sperry entered the device in a "Safety in Flight" competition in France and won the 24,000 franc prize and medal. Five years after the war it was demonstrated in England. There were several troubles experienced in those days which made it unreliable under certain conditions. During the war, Charles F. Kettering of Dayton, Ohio, devoted much attention to the development of the automatic pilot and assisted greatly the Air Service engineers at McCook Field in their experiments. The Army then spent a considerable amount of money and time perfecting certain vital units of the mechanism, but did not actually adopt it as standard equipment. The recent activities in aerial transport operation have created a new demand for such a device, inspiring the interest of William B. Mayo, chief engineer of the Ford company, who, with Mr. Elmer Sperry, made plans for its use in large airplanes. Mr. Sperry is now actively engaged in its development.



The Sperry gyroscopic electrical control for airplanes

berger, with Mr. Elmer A. Sperry, Jr., of the Sperry Gyroscope Company, manufacturer of the new pilot. On its most recent trip from Dayton to Detroit it functioned perfectly, requiring only two adjustments in course direction, these adjustments being made necessary only by the changing wind condition.

The new automatic pilot weighs fifty pounds and occupies a space of only 14 by 14 by 10 inches beneath the pilot's seat. Its operation actuates the three major controls of an airplane; the rudder for direction, the elevator for upward and downward movement, and the ailerons for maintaining lateral balance. One vertically mounted gyroscope and one horizontally mounted gyroscope, the armatures of which are electrically driven at 15,000 revolutions per minute, are used.

The gyroscopes maintain certain definite positions regardless of the motion of the airplane itself. The airplane moving around the gyroscope makes and breaks electric cir-

cuit and causes one electro-magnet to become magnetized. This magnet attracts a small clutch control member linking the flexible power shaft through gears to the aileron control cable. The resulting pull on the cable brings the airplane back to an even keel. Three clutches, each one of which responds to a pair of electro-magnets, are required to transmit power for operation of the three major controls.

This controlling action is exactly what an experienced pilot would do except that it starts promptly and continues with a smoother action. It is said that the new automatic pilot is sensitive to a change of movement of one-half of one degree of the airplane about its axis, which is more sensitive than the average pilot. The automatic pilot actuates the controls so smoothly and firmly that a pilot cannot overcome its action by hand.

The action of the device may be terminated at any desired moment upon the part of the

# A ROBIN HELPS FIGHT a Minnesota Forest Fire

Out of the North . . . another story of how the  
Robin  
"comes through"  
in an  
emergency

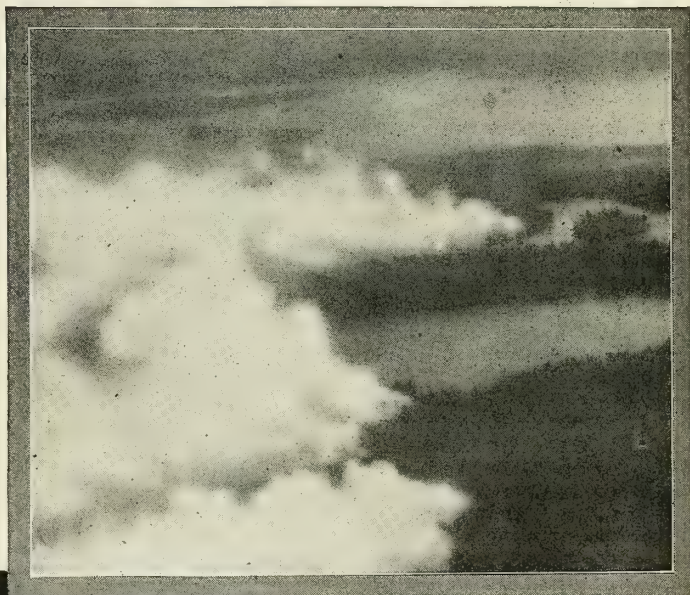
**F**IRE in the backwoods, fanned by a stiff wind. At the first alarm, a pontoon-equipped Robin skims the smooth surface of a tree-lined Minnesota lake. An aerial fire-fighting crew goes toward an inky black pillar of smoke 4,000 feet high . . . through a thick hot haze into the fire swept regions. Down . . . between a strip of blazing woodland and a wall of smoke, to a landing on a tiny fire-walled lake.

Action aplenty—equipment landed, a quick survey. Back into the Robin for a fast retreat. Out . . . the only way out is up . . . almost straight up. No job for an unstable plane. But the Robin never flinched. Safely back at the base . . . ready for the next test. That's the story of a Robin fire patrol plane, told by Harry Davidson, a Minnesota pilot.

Under the most hazardous of conditions, a Robin pulls through. Severe tests, unusual demands, and emergency manoeuvres—all in a day's work.

The all-weather, all-purpose Robin can do a first rate job in charter work or student training, or for private use in sport or business.

And remember, behind every Robin there are 40 Curtiss-Wright operating bases and over 100 dealers throughout the country to give you quick and complete service day or night.



TWO REMARKABLE PHOTOS of the Minnesota forest fires taken from the fire-fighting Robin. Under these day in and day out flying conditions, the Robin pulled through without a trace of trouble. Harry Davidson, the pilot, said "Forest fires raise merry hades with the air," and we can well believe it.



PILOT HARRY DAVIDSON and the pontoon-equipped Robin ready to take off at a moment's notice. See the heavy load of fire-fighting apparatus on the pontoon.

A word from you and complete information about the Robin and the location of the nearest Curtiss base will reach you immediately. At the field you can see it, fly it, and give it every test you want.

## CURTISS-ROBERTSON AIRPLANE MANUFACTURING CO.

DIVISION OF CURTISS-WRIGHT CORPORATION

Sales Office: 27 West 57th St., New York City



# MULTIPLE DISC BRAKE

**T**HE development of a satisfactory brake for large airplanes, and particularly large amphibions, has been, up to the present time, a most difficult problem. Particularly in the case of the amphibion, the necessity for a retractable landing gear makes the brake problem more difficult than otherwise. The Engineering Department of the Sikorsky Aviation Corporation started a long series of designs and tests of wheel brakes. The result is the new multiple disc brake now in production, and being applied to all Sikorsky amphibions.

The amount of braking obtained from a given pedal pressure decreases as the diameter of the brake increases. Consequently, a point is reached beyond which a pedal pressure within the strength of the pilot is more or less ineffective. Various types of self-energizing brakes are available which, under favorable conditions, will increase the amount of braking from a given pedal pressure to about two and one-half times that of an ordinary band brake.

Calculations and tests indicated that this amount of braking would not be sufficient for the Sikorsky amphibion. Greater self-energization seemed to be out of the question because of the possibility of the brakes locking. Accordingly, experimental work was started on the design of multiple disc brakes.

Two stationary plates pressing against one rotating plate will give twice the braking action with the same pedal pressure as two plates pressed together. This rule holds as the number of plates increases; the braking action obtained above that of two plates is the multiple of the number of plates used, minus one. This then affords the opportunity to secure any desired amount of braking action and makes possible the construction of brakes of sufficient power to stop any plane.

Weight in airplane construction is, of

course, of primary importance, and in order to avoid heavier wheels, it was thought desirable to apply the braking action directly to the rim of the wheel if possible. Large diameter braking surfaces also have many advantages. Accordingly, it was decided to use two rotating rings and support and drive them by fingers riveted to the wheel rims. This construction makes possible the use of the same wheels as before, and without any increased wheel weight, except for the comparatively light fingers used to drive the rotating rings of the brake.

The multiple disc brake offers practically unlimited possibilities for having large braking surfaces. The difficulty in using large surfaces is, however, that of securing uniform pressure over the braking areas, without heavy construction. Most of the experimental work in connection with the brake development was directed toward securing such even distribution of pressure without undue weight.

The accompanying illustration shows clearly how this was done. There are three stationary plates; the outside and inside plates have brake lining riveted to one side only, and the center plate has brake lining riveted on both sides. The duty of the arms of these stationary plates is to support the brake lining and to carry the braking torque inward to the axle. These plates are but sixty-two thousandths of an inch thick, and yet, because the metal is placed in line with the stresses, these three plates carry safely to the axle a torque in excess of twenty-five thousand inch pounds, which means that there is a turning action on the bolts holding the stationary plates to the axle flange of slightly over twelve thousand pounds.

In the cockpit of the Sikorsky amphibion, located between the rudder pedals, are two hydraulic cylinders operated by brake pedals. These cylinders are connected with the axle

through flexible hose and thence to one cylinder on each of the three sets of stationary arms. This makes three cylinders to each wheel. All cylinders are connected on each wheel so that they work together, and when pressure is applied to the pedal in the cockpit, hydraulic pressure is applied to all cylinders on each brake, causing the pistons to travel outward. Both the cylinders and pistons are connected through locking levers so that the outward force of the cylinders and pistons results in an inward pressure, tending to clamp the three stationary arms and the two rotating rings together. The rotation of the wheels causes the rotating rings to turn. Since the rings are clamped between the brake lining on the ends of the stationary members, a strong resistance to rotation is set up, which is carried down to the axle and thence into the hull of the ship.

This turning movement is communicated to the entire ship, and if it should become too great, would result in nosing the ship over. This has been taken care of by moving the wheels slightly forward, thus increasing the weight on the tail skid and setting up a strong moment, tending to reduce the possibility of the ship's nosing over as a result of the braking action.

The new Sikorsky brake has proved to be very satisfactory in operation and free from most troubles caused by the severe service of alternate immersion in salt water and quick drying after take-off.

## COURSE-SHIFT INDICATOR

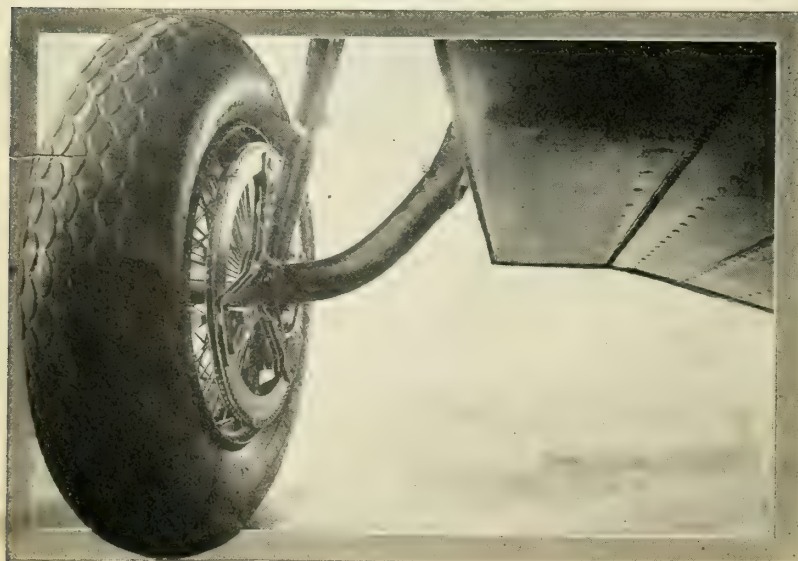
for the Double-Modulation  
Type Radiobeacon

*Abstract of Bureau of Standards  
Research Paper*

By H. DIAMOND AND F. W. DUNMORE

**T**O further increase the reliability of the visual directive radiobeacon system developed by the Bureau of Standards, a course-shift indicating instrument primarily for station use has been developed which serves a twofold purpose—(1) to indicate to a station operator whether a given course as laid out in space remains unvarying during a given time of operation, and (2) to greatly facilitate a check of the beacon calibration.

The circuit arrangement used in applying this instrument at the beacon station comprises a rotatable pick-up coil inductively coupled to the two loop antennas of the beacon, a detector-amplifier unit, a suitable filter unit, and a differential ratio instrument. The ratio instrument consists of two fixed field coils and an armature or rotor coil. A pointer attached to the rotor coil moves over a suitable scale. The force actions of the two field coils upon the rotor coil are in opposition so that with equal currents in the field coils the pointer assumes a mid-scale position. The filter unit is so designed that with equal 65 and 85 cycle voltages impressed upon the instrument equal currents flow through the field coils. If the 65-cycle voltage becomes greater than the 85-cycle voltage, one field coil carries a greater current than the other and the net



Multiple disc wheel brake as used on the Sikorsky amphibion

(Continued in 3d column, page 170)



# CURTISS CONQUEROR ENGINES *reduce* *Operation and Maintenance Costs for T. A. T.*

**PAUL F. COLLINS, General  
Superintendent of T. A. T., says:**  
"We consider Conqueror's  
performance most creditable  
for transport operation."

**H**ERE is the first story of 4 Conqueror engines in everyday transport service. In answer to an inquiry, Mr. Collins gives these vital facts on Conqueror performance.

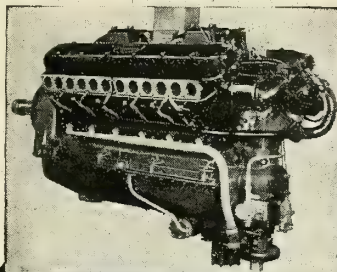
He says in part: "In the matter of routine service, we found the Conqueror required less work than the air-cooled type, in fact we considered this motor's performance most creditable for transport operation. Will say also that standard aviation gas was used with no harmful effects, as far as we were able to ascertain without tearing the motors down, which we have not done as we consider that from the present performance they should be run from 300 to 400 hours without overhaul.

"The gas consumption at an average motor speed of 2100 r.p.m. was 29 gallons per hour and the oil consumption approximately  $\frac{1}{2}$  gallon per hour per motor."

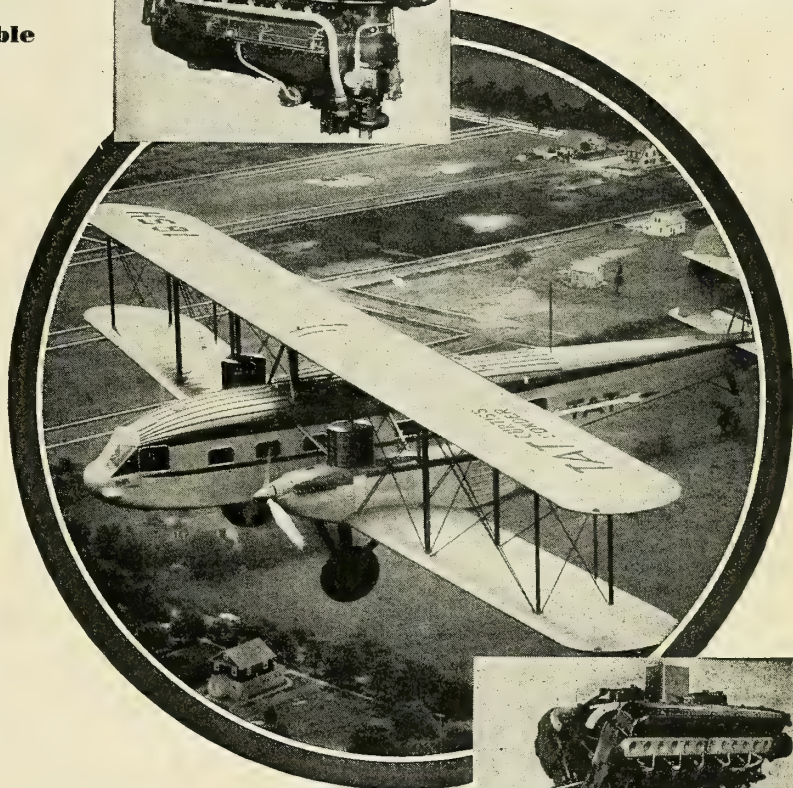
Here is proof that the Conqueror, 12 cylinder, Vee type, liquid-cooled, 600-horse power engine gives a decided advantage to commercial transport planes. Low fuel consumption . . .



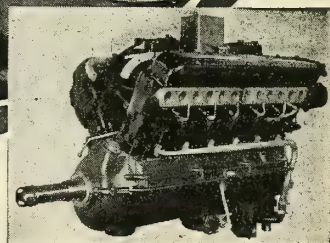
Note the exceptional visibility forward! The Conqueror also gives added speed to the Carrier Pigeon II, through streamlining and low frontal area.



HP (Rated) 600 at 2400 R.P.M.; Arrangement of Cylinders 2 blocks of 6 cyl. in each at 60°; Length of Engine 63-1/16"; Width of Engine 26-5/16"; Height of Engine 36-5/8"; Bore 5-1/8"; Stroke 6-1/4"; Displacement of Engine 1569 Cu. In.; Compression ratio 5.8 to 1;



**Economical power! 58 gallons of standard aviation gas and one gallon of oil per hour consumed by these 2 Conquerors in the Condor.**



Ignition System (Type & Make) Scintilla Magneto (dual); Carburetor 2 Stromberg NA-Y6-O; Normal Oil Inlet Temp. 140° F.; Oil Pressure Desired at 2400 R.P.M. 100 to 120 lbs. per sq. in.; Oil Consumption .015 per B.H.P. Hour; Maximum Water Outlet Temp. Allowed 180° F.; Weight of Engine (Dry) 760 lbs.

low maintenance cost . . . high performance under all weather conditions . . . a high degree of reliability through flexible range and excess power . . . added plane speed through adaptation to scientific streamlining and exceptionally low frontal area.

Back of the Conqueror is a country-wide organization of 40 bases giving 24-hour service. You are always within easy flying distance of a Curtiss-Wright base.

An interesting booklet has been prepared on the Conqueror. It is at your service with other detailed information at Dept. 30, 27 West 57th Street, New York City.

## CURTISS AEROPLANE & MOTOR COMPANY

Unit of Curtiss-Wright Corporation



# JUNKERS TYPE G-38, THE LARGEST LANDPLANE

**T**HE Junkers-Flugzeugwerk A.-G. of Dessau, Germany, recently completed a giant landplane designed by Dr. Hugo Junkers, German aeronautical engineer. This ship has a wing-spread of 147 feet, a length of 75 feet, and weighs 40,000 pounds. The new craft is one of the largest planes so far constructed of landplane design, and is reported to be a precursor to much larger planes of this type planned by Dr. Junkers. These Junkers plans are especially interesting, since Dornier, the German engineer who designed the Do.X. flying boat which recently flew with 169 persons aboard, has voiced the opinion that only flying boats can be developed to great size because of the engineering difficulty of providing strength to withstand the stresses of landing on a hard surface.

The new Junkers craft, known as the G-38 is similar in outline to former Junkers models. Other than its size, however, the plane has several characteristics which are radical departures from the usual design. All bearing parts, including the entire power plants, are housed inside the structure for inspection and repair during flight. The plane has four engines, which are located in the wings and are fitted with tractor propellers. The landing-gear, wing camber and tail surfaces also include new elements in their design.

The chief difference between the G-38 and the old type of Junkers planes is that in the former the wings are of such a thickness that a greater use may be made of their interior for the accommodation of freight and passengers. The G-38 resembles closely a large model of the G-31 plane, with the exception that it is neither a low nor a high-decked machine, inasmuch as the wing section is the height of the fuselage. Duralumin sheeting is used throughout, which type of construction is used in all Junkers models. It is significant that in spite of the larger measurements of the G-38 the thickness of the corrugated sheet duralumin has remained

unchanged at three millimeters. The structural members used on the G-38 are, of course, stronger in proportion to the increase in the size. Glass windows in the wings on each side of the fuselage give passengers seated in the wings forward view.

The power-plant consists of two 800-horsepower and two 400-horsepower Junkers engines located inside the wings in such a manner that they are always accessible during flight. Apart from aerodynamic advantages, this arrangement permits greater safety in operation, for the engines may be kept under constant supervision. It is possible that a future development of this giant monoplane will be the use of the recently developed Junkers Diesel engine. The four engines are located inside the wing, two on either side of the fuselage. They are drawn forward in streamlined propeller cowlings in order to avert unfavorable effects from the tractor propellers being installed too close to the edge of the wing. One 800 and one 400 horsepower engine, fitted with four-bladed propellers, are placed in each side.

The construction of the undercarriage is of radical design. Inasmuch as the total flying weight of the plane will approximate 18 metric tons, a mere enlargement of the wheels would have been insufficient. The undercarriage consists of an adjustable frame around a practically horizontal axis, with two wheels in tandem on each side. By the action of the gear in taxiing it is possible to maintain equal loads on the two wheels of each half of the undercarriage even on rough ground. The blow-out of a single tire would cause no excessive strain on the undamaged wheel. This undercarriage further prohibits excessive bouncing and bumping when landing or taxiing, inasmuch as such shocks are transferred to the fuselage by means of a spring-bearer. Both parts of the undercarriage are covered by a streamlined hood. A tandem arrangement of the two wheels in each half of the undercarriage has the advantage of offering comparatively little resistance. Compressed air brakes are fitted to each wheel. The tail wheel has both horizontal and vertical springs which are adjustable, and it is fitted with a pneumatic rubber tire.

The plane's wingspan of 147 feet has necessitated a new development of the tail control surfaces in order to assure sufficient stability. The empennage is a radical departure from former Junkers types. It con-

sists of two horizontal stabilizers, mounted one above the other, of symmetrical profile and rectangular in shape. Attached to these planes and at a short distance in the rear, are two vertical planes, also of symmetrical profile. Between the horizontal planes, and over the middle of the tail, is a vertical fin attached to which is the rudder. The horizontal planes are supported by two V-struts. Compared with the size of the plane, the tail steering gear and the ailerons are not large. Nevertheless, satisfactory stability is expected by the designer because of the tapered wings. Despite the size of the G-38, a Servo motor has not been installed to motivate the steering gear.

The interior of the cabin is arranged in two stories; the upper for passengers and the lower for freight. This arrangement has already proved satisfactory in the G-31 type. The total length of the plane is roughly 75 feet and the height 17 feet.

## COURSE-SHIFT INDICATOR

(Continued from page 168)

force action upon the rotor coil becomes greater than zero, the pointer attached to the rotor coil moving to the left of its mid-scale position. The reverse is true if the 85-cycle voltage becomes greater than the 65-cycle. The differential action of the two field coils upon the rotor coil, therefore, serves directly as a means for comparing the relative amount of 65 and 85-cycle modulation in the radio-frequency voltages induced in the pick-up coil coupled to the two-loop antennas.

Corresponding to each setting of the beacon course, there is a definite ratio of 65 to 85-cycle modulation in the two loop antennas of the beacon. For each course setting, then, there is a definite position of the rotatable pick-up coil at which the amounts of 65 and 85-cycle modulation in the voltage induced in the coil are equal, the instrument pointer being then at its mid-scale position.

The course-shift indicator has a twofold application at the beacon station.

1. For a given course setting the coupling coil is rotated so that the instrument pointer is at center scale or zero. A station attendant is then certain that the course marked out in space remains unvarying so long as the instrument pointer remains at zero. A change in course of  $0.1^\circ$  is readily detected. Easy adjustment is provided on the beacon transmitting set whereby a shift in the course once detected may be corrected.

2. If, during the original calibration of the beacon, the settings of the scale attached to the pick-up coil, when ratio instrument reads zero, corresponding to the various beacon course settings are recorded, the beacon is calibrated once and for all. A recalibration of the beacon may then be effected very rapidly and within the beacon station.

The instrument described may also be used as a visual course indicator on large aircraft. Its advantages and disadvantages as compared with the vibrating-reed course indicator are discussed in Research Paper No. 77.



The giant Junkers G-38 and the light Junkers sport monoplane



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Here at Collier's you will receive the right training—the proper equipment—with the best instructors.

Under the personal supervision of some of the best fliers in the Southwest individual students are taught to fly by flying. All instructors are licensed transport pilots. All airplanes are government licensed. Only the latest model air-cooled radial engines are used.

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## LINCOLN PT

**T**HE Lincoln PT is a two-place, open cockpit biplane produced by the Lincoln Aircraft Company, Inc., of Lincoln, Nebraska, and built as a primary training plane. Both cockpits are fitted with controls, the one for the student having a Bloxham Safety Stick. With this stick, the student controls may be readily disconnected by the instructor. When a passenger is carried, the controls can be removed entirely. The Department of Commerce has issued Approved Type Certificate No. 181 for the Lincoln PT.

The ship is powered by an OX-5 engine of 90 horsepower. The engine is completely cowled in and is well streamlined. The engine is carried on ash beams, supported by steel tubing and secured by four mounting bolts. A telescoped heavy gauge tube is placed within the main mounting members. A terre fire plate wall divides the engine from the rest of the fuselage. Bolted to it above the engine is an expansion tank for water. The radiator is mounted below the fuselage in the slipstream and affords ample cooling. Shutters controlled from the cockpit are provided for warming the engine. Louvres located in the front and the rear of the cowling assist in the cooling. The forward louvres are reversed.

The landing gear is of heavy streamlined steel tubing with a nickel steel, split type axle, with rubber cord shock absorbers. The fuselage is of conventional design, made of welded chrome-molybdenum steel. It is 24 inches wide. All metal receives a coating of corrosion-preventing oil including the inside of the fuselage.

The rudder elevators are connected by stranded flexible cables attached directly to the control stick. The tail group is of welded steel tubing. Elevators comprise a single unit, necessitating only one horn which is placed inside the fuselage. The stabilizer is adjustable from either cockpit.

The wings are conventional in construction. The spars are spruce and solid throughout. Ribs are basswood and are provided with top and bottom cap strips. Extra nose pieces are placed on the leading edge of the wing to prevent the fabric from drawing between the nose ribs. The wings are designed and fitted to permit replacement. Gasoline is carried in the fuselage in a tank holding 29 gallons, with 5 gallons reserve. Feed to the carburetor is by gravity.

Standard equipment includes altimeter, tachometer, and oil and temperature gauges may be installed in dual or single sets. Right and left-hand throttle controls are provided.

The ship takes off with full load within 200 feet, climbs rapidly, and has a high factor of maneuverability. It has a high speed of 100 miles per hour, a landing speed of 30 miles per hour and a cruising speed of 85 miles per hour.

## FLEETCRAFT MODEL A SPORT PLANE

**T**EST flights were recently completed by the Fleetcraft Airplane Corporation, Lincoln, Nebraska, on the Fleetcraft Model A two-seater sport plane.

The new company is headed by Mr. J. B. (Johnny) Moore, who is the designer of the original Arrow Sport. The company has drawn up plans for a factory building which will have an area of approximately 50,000 square feet.

The Fleetcraft has a wing span of 27½ feet upper, and 24 feet lower, with 53-inch and 47 5/10-inch maximum cords, respectively.

This ship is a side-by-side open cockpit biplane. Fuselage is of steel tube construction, with welded joints embodying the Warren truss system. This truss is used from the stern post to the motor mounting. Dural fairing is used to effect the streamline on the fuselage. Lateral controls are actuated by a single steel tube working in tension and compression.

The undercarriage is of the split axle type and is built of streamline steel tubing. The axles are fixed to a small quadruple brace directly in the center of the undercarriage.



Side-by-side seating is a feature of the Fleetcraft sport biplane

This brace is detachable and may be replaced without trouble. The shock cord is placed on the axles near the center. At this point the axle size is reduced and works inside the main axle. This allows the shock cord, which is fastened to retainers on the axle, to function. The landing gear Vs are built to stand the abuse of students. Streamline tubing is used in the construction.

Wings are built with a center section and four panels. Ailerons are built into the lower wings, which arrangement allows positive control system through the lower wing, reducing parasite resistance caused by outside controls. Swadge landing and flying wires are used in bracing the wings and the center section. N-struts are used in the center section, as well as on the outer bay. In the center section there is ample space for a twenty-two-gallon fuel tank.

Horizontal stabilizer, elevators, fin and rudder are built entirely of steel tube with welded joints. The horizontal stabilizer is adjustable. All controls are designed to be effective at low speeds. The stabilizer is operated by the same type of control as the ailerons. Straight cable control is used on the rudder. The elevators have a combination cable and positive control.

The Fleetcraft Model A is powered with an approved 65-horsepower engine; other types are being built that can be powered with engines up to 110 horsepower.

## NEW PRODUCTS OF THE STARRETT COMPANY

**A** CYLINDER gauge designed to measure small bores was recently introduced by the L. S. Starrett Company of Athol, Mass. It is known as the No. 452AA Junior Cylinder Gauge and is intended to provide easy and accurate reading of tapered, out-of-round or scored cylinders.

The No. 452AA gauge has a capacity of from 1½ inches to 2½ inches. An adjustable dial marked plus and minus is provided and calibrated by thousandths. The gauge has hardened and ground steel sled and contact points. It has a double spring action designed to make it self-centering and non-collapsible.

### Flexible Steel Rule

**T**HE Starrett company has also placed on the market a new flexible steel rule No. 323 which has the usual 64ths and 32nds graduations, and which has every 4th graduation of 32nds and every 8th graduation of 64ths numbered.



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# Are you contemplating the purchase of a single-engined cabin plane for 1930?

## Consider the Official Results of the Fifth Annual Ford Reliability Tour!

### CONDENSED OFFICIAL RESULTS OF 1929 NATIONAL AIR TOUR

#### Single-engined Cabin Planes Only

Position at Finish Among All Types	Make of Plane	Seating Capacity	Pilot	Make of Engine	D. of C. Max. Allow.		Useful Load (lbs.)	Stick Time (secs.)	Unstick Time (secs.)	Maximum Speed (m.p.h.)	Figure of Merit (points)	Average Speed Made Good (m.p.h.)	Score (points)
					Gross Load (lbs.)	Allow.							
5th	Bellanca	6	Capt. Geo. Haldeman	Wright J-6 300 h.p.	4,600		2,310	9.1	11.5	141.56	1,044.85	132.4	33,277.40
6th	Bellanca	6	R. A. Nagle	Wright J-6 300 h.p.	4,075		1,797	6.5	9.7	143.71	1,022.64	125.0	31,090.22
11th	Cessna	6	Stanley Stanton	Wright J-6 225 h.p.	3,100		1,229	7.1	9.7	145.51	892.70	131.7	27,759.84
12th	Curtiss-Thrush	6	Dale Jackson	Wright J-6 225 h.p.	3,800		1,540	7.2	9.8	113.88	865.60	114.6	27,699.20
13th	Cessna	4	{Earl Rowland J. Meehan	Warner 110 h.p.	2,260		1,035	5.0	12.6	131.48	1,067.75	44.4	27,664.36
14th	Cessna	6	Steve Lacey	Wright J-6 300 h.p.	3,180		1,248	8.3	7.0	152.15	873.34	136.2	26,810.36
15th	Fairchild	7	Richard Pears	P & W Wasp 420 h.p.	5,500		2,570	6.9	13.7	130.06	725.08	120.4	22,566.02
17th	Lockheed	7	Wiley Post	P & W Wasp 420 h.p.	4,265		1,775	11.0	10.4	160.35	665.93	145.4	21,073.39
18th	Curtiss-Thrush	6	J. L. McGrady	Wright J-6 225 h.p.	3,800		1,540	11.6	10.8	120.32	738.16	53.9	20,272.95
19th	Ryan	6	Russell Young	Wright J-6 300 h.p.	4,000		1,749	10.7	11.1	126.80	691.31	59.6	19,929.49
22nd	Curtiss-Robin	3	Gentry Sheldon	Curtiss Challenger 170 h.p.	2,600		962	8.2	9.3	100.30	597.09	108.0	18,967.99
24th	Travel Air	6	Newman Wadlow	Wright J-6 300 h.p.	4,315		1,488	12.1	11.3	125.78	553.18	100.1	14,740.77

\*Average speed made good is calculated on total elapsed time between controls over entire tour.

THE figure of merit for each contestant in the Ford Reliability Tour was determined on the formula:

Maximum Dept. of Commerce  
USEFUL LOAD

X

Unstick + 1/2 stick

maximum speed

X

Cubic-inch displacement  
of engine

50

take the heaviest load in and out of the smallest field

—will fly the fastest with that load—and will do all

this with the least horse-power!

which, translated into English, means that an airplane will have the highest merit points which will—

Study the Official Results printed above, and you will see that compared with all other single-engined cabin planes the BELLANCA is 20% to 126% more efficient. That means the BELLANCA six-place cabin monoplane, the *Pacemaker*, can carry its amazingly heavy load at a far lower cost than any other cabin airplane represented.

The BELLANCA victory of the Cleveland Races was repeated by that of the Ford Tour. In the official tests made at Detroit, the BELLANCA *Pacemaker* carried its full useful

load of 1,797 lbs. with a speed of 143.71 m. p. h., a take off of 9.7 seconds and a landing of 6.5 seconds. Carrying 2,310 lbs. useful load, *equivalent to full tanks and TEN people*, the BELLANCA Freighter (a stock-model *Pacemaker* with large freight or mail compartment) showed in speed 141.56 m. p. h., take-off of 11.5 seconds and landing of 9.1 seconds. And at that, these BELLANCA tests were run at the last moment in a dead calm, though a wind of 6 to 10 m. p. h. had favored the other contestants.

And then . . . over the entire tour, a grueling grind of almost 5,000 miles, the official results show BELLANCA among the *three highest speeds* of the contest *regardless of types* . . . two BELLANCA monoplanes far ahead of all other single-engined cabin planes, *in which class they finished first and second* . . . two BELLANCAS the only single-engined cabin planes among the first ten "in the money" . . . 5,000 miles of competitive touring at an average speed of 132.4 m. p. h.

Does either the BELLANCA *Pacemaker* or the 300 h. p. Wright Whirlwind Nine Engine need any further demonstration in proof of leadership?

We have completed an analysis of the tour, with particular reference to single-engined cabin planes, copy of which will be mailed anywhere in the world upon receipt of written or wired request.

Bellanca Aircraft Corporation  
New Castle, Delaware, U. S. A.  
Cable address: *Bellanca*

# BELLANCA







## TRIMOTORED BERNARD PLANE

By

Paul E. Lamarche, Jr.

READERS of AERO DIGEST who recall the Bernard *Oiseau Canari*, or *Yellow Bird*, which carried Messrs. Assolant, Lefevre and Lotti across the Atlantic to Santander, Spain, will recognize an interesting development of this prototype in the new Bernard 60.T., a trimotor commercial monoplane. In general the new Bernard follows the lines of the transatlantic plane, but is an enlarged development of the eight-passenger, single-engined 190.T. monoplane which this firm has built for use on the C. I. D. N. A. Line of France. These ships are built by the Société Anonyme Bernard at La Courneuve, an industrial town in the Paris region.

The Bernard 60.T. was planned and constructed especially for commercial service, though its designers had at first planned such a plane for military use. In designing this new plane, the designer, Mons. Galtier, who worked under the direction of Mons. Becheureau, studied it from the standpoint of safety and simplicity and has introduced several innovations in this respect.

The wing construction follows that of the previous Bernard monoplanes. It has an unbraced high wing of wood construction built in one piece. The internal structure is made up of spruce spars and plywood ribs. The wing is entirely covered with plywood. On the new Bernard the wing has been slightly modified to allow greater speed. The tail surfaces are of conventional construction and the stabilizer is adjustable in flight as well as on the ground. All parts are constructed with wood frames and are covered with plywood.

The shape of the fuselage has been studied with the view of reducing head resistance without discarding the rectangular dimensions of the cabin which make possible a comfortable arrangement of passenger accommodations. The structure of the fuselage consists of two principal vertical beams upon which are built up the wooden frames covered with plywood. The structure is so designed that no cross members interfere with free movement in the cabin, and no bracing or cross pieces obstruct vision from the windows.

The passenger cabin is arranged to accommodate twelve passengers in four rows of three seats, one seat being placed on the left of the aisle and two on the right. Eight windows are arranged four on either side of

the fuselage next to each row of seats. The position of the high wing gives the passengers an unobstructed view. Normally, passengers enter the cabin by a door in the back that is low enough to allow access without the use of steps. A second door has been placed forward and can be used as an emergency door for rapid exit of the passengers in case of accident. The cabin is heated by a circulation of hot air from the engines, and ventilators are placed along the upper part of the fuselage. The cabin has a double wall, and with silencers on the engines, the noise has been reduced to a minimum. Lighting of the cabin is by ceiling lights. Behind the cabin is a small lavatory containing a toilet and wash basin. Beyond the wall separating the cabin from the tail is a baggage compartment. A second baggage compartment is located under the pilot's cockpit in the nose. The radio apparatus, which consists of an AC3 sending and receiving set, is also placed in a special compartment in the rear of the cabin.

The pilot's seat is placed ahead of the wing, permitting good vision in all directions. A cabin encloses all of the cockpit, which is arranged with two seats and dual control, and which is separated from the passengers' cabin by a door. The small cabin over the cockpit has sliding windows at the sides. The upper part can be opened in flight to allow the pilots to leave the plane with parachutes.

The new Bernard is powered by three engines, a Gnôme-Rhône Jupiter 420-horsepower engine in the nose and two lateral power plants which are Gnôme-Rhône Titan 230-horsepower engines. The two lateral engines are built into nacelles that extend out from the thick wing rather than being suspended below the wing as in the case of other similar types. Access is provided to the various parts of the engines, especially the carburetors, magnetos and pumps. Each of the engines is equipped with a Viet compressed air self-starter and drives a metal propeller. Fuel for the three power units is supplied from two tanks whose total capacity is 600 litres of gas. One of these is carried in the thick wing and the second in the fuselage, and both can be dropped in an

emergency. Each engine is equipped with two pumps which draw fuel from a common collector that connects with both tanks.

The landing gear has a particularly wide track and is composed of two inverted pyramidal forms made by steel struts with the shock absorbers being placed on a strut connecting the wing and the axle. The wheels are equipped with brakes—a feature unusual for European planes.

### Specifications

Span.....	70 feet 6 inches
Length.....	52 feet 5 inches
Height .....	13 feet
Height of propellers above ground (central)	7 feet 6 inches
(lateral) .....	10 feet 9 inches
Wing area.....	709 square feet
Track of landing gear.....	14 feet 8 inches
Weight empty.....	7,470 pounds
Total weight.....	12,100 pounds
Wing loading.....	16.8 pounds per square foot
Power loading.....	13.7 pounds per horsepower

### Performance

Maximum speed.....	136 miles per hour
Cruising speed.....	117 miles per hour
Stalling speed.....	58 miles per hour
Range .....	560 miles
Climb to 1,000 metres (3,280 feet)	6 minutes 50 seconds
Service ceiling.....	15,750 feet
Absolute ceiling.....	17,000 feet
Take-off run .....	700 feet

## ANTI-CORROSION MACHINE

A MACHINE for treating fuselage structures against corrosion which is claimed to reduce the time of the operation and to effect a saving in materials, has been designed and put in operation by P. O. Gibson, production manager of the Nicholas-Beazley Airplane Co. The oil treatment is applied by the deluge process in a cylindrically constructed booth through which the fuselages pass on an overhead trolley supported by wire cables. Slots in the top of the booth allow the trolley to pass through, and the fuselages are suspended to dry over drain troughs which carry off surplus oil.

The oil is applied from perforated tubes inside of the cylindrically shaped booth. Pressure is supplied by an electrically driven rotary geared pump.



# TWO RECORD PERFORMANCES

*Blaze a New Name Across the Nation's Highways*

# INLAND SPORT MONOPLANE



**I**N a fully loaded stock model Inland taken off the production line, Lieutenant Willfred G. Moore recently made a new world's speed record for Light Airplanes of the First Category. The plane was the same he had previously flown in establishing a new American Record for altitude.

Moore's plane is a stock model Inland. It was *not* especially designed or built for these trials. It is exactly the kind of ship you would get if you bought an Inland tomorrow. Weighing 850 pounds empty, on the occasion of these trials it carried a load of 330½ pounds, including pilot.

## 123.17 Miles an Hour

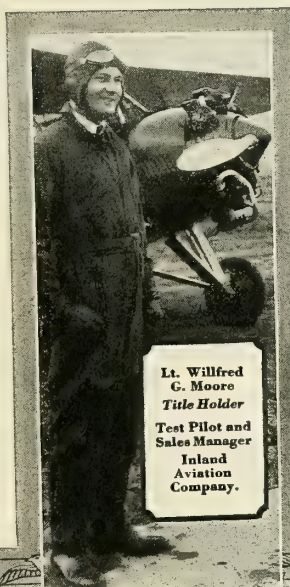
*World's Record for Light Planes*

On November 4 Lieutenant Moore flew his Inland Sport Monoplane with a Warner Scarab engine over a 100 kilometer closed course in 30 minutes, 12.45 seconds... at a speed of 123.17 miles an hour. This is 3.31 miles an hour faster than the former record, established in December, 1928, by A. S. Butler, an English flier.

## 19,659 Feet Altitude

*American Record for Light Planes*

Previously on October 25, Lieutenant Moore had set a new American light plane record for altitude, by flying the same Inland Sport Monoplane to a height of 19,659 feet. This is only 200 feet from the world's record.



Lt. Willfred  
G. Moore  
Title Holder  
Test Pilot and  
Sales Manager  
Inland  
Aviation  
Company.

**T**HESE two records are official evidence that the Inland has performance far better than the average light airplane.

Inland Sport Monoplanes are manufactured in a fine new factory at Fairfax Airport under Approved Type Certificate No. 259. The Inland is a high wing two-seater monoplane with side-by-side seating arrangement. It is powered with a LeBlond 60 or Warner Scarab engine.

Well financed and well-equipped distributors who need a small, low price sport plane to complete their line will do well to investigate the Inland proposition. For refinement of design, beauty of line and color, and for performance and reliability, the INLAND SPORT has few equals.

**INLAND AVIATION COMPANY**  
Kansas City, Missouri

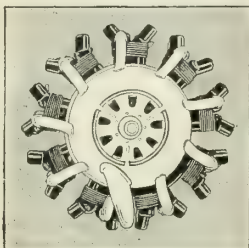




# "Authorized"

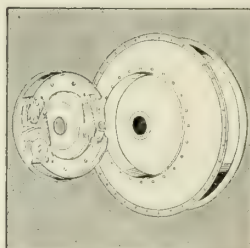
A NUMBER of the key manufacturers of motors, planes and aircraft accessories have appointed Air Associates, Inc. as sales and service representatives. It is good judgment therefore to rely upon Air Associates for expert service and for the right parts, whether

the job is a complete motor overhaul, a bad crack-up or just a simple replacement. Following are representative examples of aeronautical equipment which Air Associates has been authorized to distribute and service at Roosevelt Field and at the Chicago Municipal Airport.



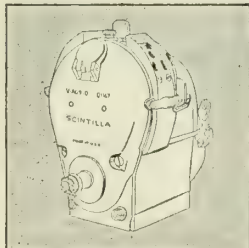
## WRIGHT Parts

A complete stock of Wright parts is always carried for rush service from the A. A. branches at Garden City and Chicago. Every necessity from a cotter pin to a complete assembly is kept available for delivery. Rush orders are shipped the same day as received.



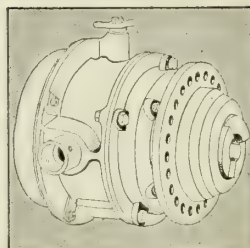
## BENDIX Wheels & Brakes

Bendix Wheels, equipped with the Perrot 2-shoe Servo Brake, will enable you to make safe landings in small fields and eliminate the necessity for a ground crew. Air Associates is in a position to make delivery on Bendix Wheels and Brakes for planes of from four thousand pounds to twenty thousand pounds.



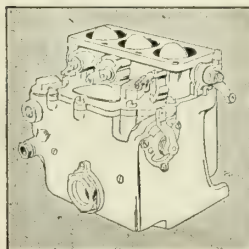
## SCINTILLA Magnetos

The dependability, simplicity and accessibility of Scintilla Magnetos make them the choice of 95% of the aeronautical manufacturers. A complete stock of Scintilla Magnetos and parts is offered at authorized factory prices.



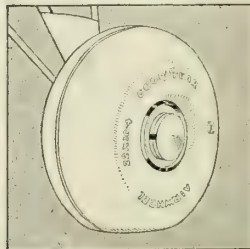
## ECLIPSE Starters & Generators

Eclipse Aviation Inertia Starters are made in hand, combination hand and electric styles. They fill the need for a light and efficient method of starting heavy duty engines safely and surely. Eclipse Aviation Generators are engine or wind driven and will keep your battery almost constantly on full charge, avoid overcharging and insure longer battery life.



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Stromberg Carburetors are standard equipment in the foremost aviation engines. Air Associates is prepared to furnish these well-known carburetors and parts for all models and makes of engines to which they are adapted.



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technical background that inspires confidence. Stocks are kept complete at all times. Experienced service men for every type of aeronautical work are always available. Parts are sold at authorized trade prices.



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to keep your plane in the Air"*



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# WESTERN NEWS

## WESTERN AIRCRAFT SHOW A SUCCESS

**U**NDER the directorship of Clifford W. Henderson, the Western Aircraft show, held from November 9 to 16 at Los Angeles, turned in a credit account of sufficient bulk to prove its merit. As able helpers, Henderson had Fred A. Worthey, Harry Wetzel, Waldo D. Waterman, G. E. Moreland, and Howard Miller, officers of the Western Aircraft Exposition Association, which sponsored the event.

The show building, covering two city blocks, was brilliantly lighted both inside and out and was pleasingly decorated. A stage in the center of the building, upon which the entertainment was held, was equipped with an address system presided over by Vic Clark, the announcer. Surrounding this, the center sections quartered sixty-two planes and gliders on exhibition, while ninety-four booths bordered the walls. Exhibition space totaled 100,000 square feet with more than \$1,000,000 worth of airplanes and aircraft accessories on display.

Planes ranging from single-place gliders to trimotored transports held much of the interest, while the engine, accessory, instrument, and oil company exhibits commanded no small amount of attention. Eastern manufacturers were about equally represented with Western producers, indicative that the Western market carries weight beyond its boundaries. An electrical display featured the opening of the show.

The single and two-place aircraft were represented by Davis, Fleet, Aeronca, Courier, Populair, Fairchild, Great Lakes, Mono, Timm, Kari-Keen, Lincoln PT, Avion, Curtiss, Gipsy, D H Moth, Hanriot, Bowlus Sailplane and Evans Glider.

Three, four, and five-place planes included the Waco, American Eagle, Curtiss, Ryan, Emsco, Fairchild, Travel Air, More-

*By Harry Maynard*

land, Stearman, Spartan, Stinson, Barling, Pitcairn, Crown, Butler, Parks, Courier, Brunner-Winkle, and the Ireland and Savoia-Marchetti amphibians.

All planes were prompt in their arrival, the greater portion being flown to a convenient field a half-mile from the auditorium and towed at night to the exhibit. None of the larger class of planes had to be assembled at the show, all being able to get into the adjacent landing area. This latter class included the Fokker Super-Universal, Lockheed Vega, Fairchild 71, Travel Air, Javelin, Bellanca, Emsco, Kreutzer and Bach planes.

Decided attention was directed to the

engine exhibits which were equally representative of both the Eastern and Western industry. The Apache, Axelson, Cirrus, Comet, Curtiss, Kinner, Menasco, Pratt and Whitney and Wright products each drew large crowds. Marked interest was displayed in the showing of the new Apache two and three hundred horsepower, seven-cylinder, radial, air-cooled engines, which have been developed at the Apache plant at the Los Angeles Metropolitan Airport, and which will shortly be given the Department of Commerce tests for approval.

Novel demonstrations of a reversible pitch propeller were conducted several times daily during the Western Aircraft Show in an open-air arena adjoining the main building. Large groups gathered to witness the forward and backward taxiing of the Fokker Super-Universal, the tail of which was mounted upon a large dolly, the pull of the propeller being reversed to a push, making possible this unusual spectacle. A. K. McCloud, designer of this propeller, was in charge of the demonstration with his associate, C. L. Fuller, of the Richfield Oil Company.

The distinctively decorated booths housed displays of practically every accessory known to the aeronautic industry as well as the essential components. The oil companies were represented in elaborate exhibits, Associated, Kendall, Richfield, Shell, Standard, Texas and Union comprising the lot.

Accessories included Aero Products Co., American Paulin Co., Behrendt-Levy Co., Bullet Air Cleaner, Champion Spark Plug Co., Crawford Supply Co., Crouse-Hinds Co., Circo Co., DeWalt Machinery Co., Fyre Flyer Pacific Co., B. W. Griffiths, Gruss Air Spring Co., Harwin Products Corp., Irvin

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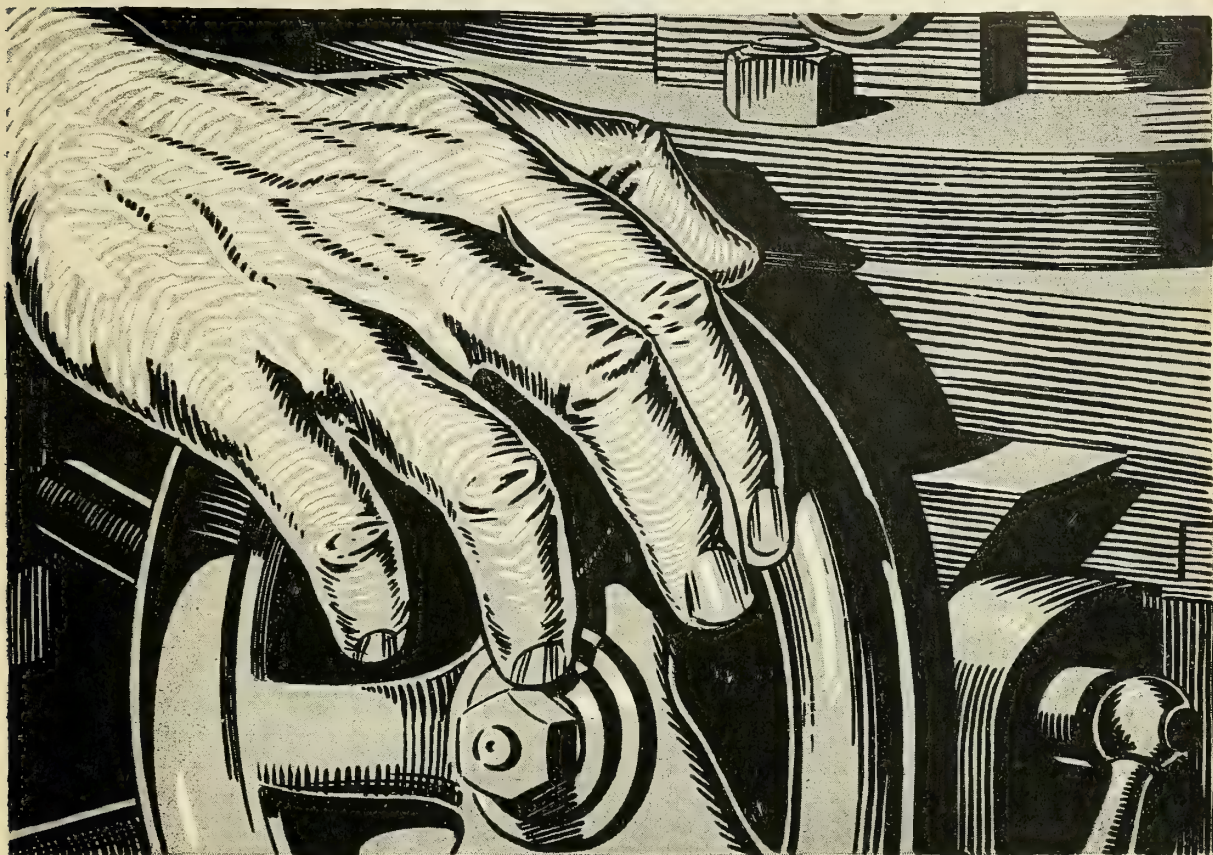
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A section of the aircraft exhibit at the All-Western Aircraft Show at Los Angeles, showing the Lockheed, Parks P-1 and P-2, and Ryan planes displayed



FIRST AROUND  THE WORLD



## AFTER ALL... IT IS MEN...NOT MACHINES

The human element, after all, is the most important single factor in aircraft production!

Call it craftsmanship, workmanship or what you will, it is the presence or absence of this quality that, in the final analysis, proves or disproves a plane's airworthiness!

Douglas holds industrial intelligence among its craftsmen to be of paramount importance. It stands as the final insurance that Douglas engineering will be faithfully transcribed and properly fused with quality materials in the finished product.

It is a matter of pride with each Douglas craftsman that this responsibility is his. And to this existing spirit can be attributed the fact that wherever these planes are flown...

*Douglas Means Dependability!*

DOUGLAS  
AIRCRAFT CO.  
INCORPORATED  
*Santa Monica California*





Sketch of the new clubhouse of the California Aviation Club at the flying field of the organization near Beverly Hills, Calif.

(Continued from preceding page)

Air Chute Co., Johnson and Higgins, Freeman Lang, Lux Fire Extinguisher, Macwhyte Co., Nicholas-Beazley Co., Otto K. Olson, Pacific Airmotive Corp., Pacific Scientific Co., Palmer Balloon Beacon, Port Orford Cedar Co., Postal Telegraph Co., Rule and Sons, Rummins and Murray, Russell Parachute Co., Scully Brothers, So. Calif. Telephone Co., Standard Steel Propeller Co., Union Hardware and Metal Co., Western Aviation and Supply Co., and Willard Storage Battery Corp.

Airline transport companies and airports were represented by the Boeing System, Grand Central Air Terminal, Los Angeles Metropolitan Airport, Maddux Air Lines, Nevada Air Lines, Standard Air Lines, and Transcontinental Air Transport. Firestone, Goodyear, and Goodrich composed the tire and rubber companies exhibiting. The California Flying Club, and the Southern California Chapter of the National Aeronautic Association also had booths.

Much of the success of the Western Show

was due to the efforts of the Aviation Post of the American Legion recently organized in Los Angeles, which boasts many of the country's prominent airmen as members. Through their work the keen interest shown by the entire air industry was concentrated and directed to the end of supporting the show to its profitable conclusion.

The reception of the first Western Aircraft Show by the air-minded public and its decided success vindicates the interest taken by Eastern manufacturers in the increasing market of the Southwest.

#### Club Building of California Aviation Club to Be Opened December 1

**I**NAUGURATED for private owners desiring to operate and maintain their own flying field located near residential districts, the California Aviation Club will open its airport, hangars and club house about December 1, according to officials of the club. The club was organized last summer and has since purchased 222 acres of land for the

project. The site is two miles from Beverly Hills, Cal., and within fifteen minutes drive of the residential districts.

The field is over one-half mile long on all sides and will allow main runways 3,600 feet long into the prevailing winds, and a minimum 2,600 foot runway in any direction. The entire field will be planted in grass and illuminated for night landings. Radio weather reports and meteorological information will be supplied. It is planned to border the entire field with hangars of various sizes when the building program is completed.

The club house, situated at one corner of the field, is designed to contain a lobby, card room, locker rooms, dining room and kitchen on the first floor. Several bedrooms will be on the second, with the look-out and meteorological tower located on the roof. Two smaller buildings flanking the clubhouse will contain the aviation school, field superintendent's office, servants' quarters, and gas station. The central plaza will provide automobile parking space.

Membership in the California Aviation Club is not restricted to actual owners of planes. Athletic and social facilities for the entertainment of non-flying members interested in aviation will be maintained. It is planned to give school and flight instruction and advice on the purchase of planes. Housing and servicing of machines will be provided. Club planes in charge of pilots for short or long flights will be available.

Among the officers of the California Aviation Club are: H. J. Barneson, president, George E. Read, vice president, and Walter E. Burke, secretary.

#### T. C. Ryan Flying School, Ryan Airport, San Diego, California

**I**NTENSIVE ground school training is included in the flying courses given by the T. C. Ryan Flying School at Ryan Airport, San Diego, Calif. The Ryan School is affiliated with Pacific Technical University where all ground school instruction is given, and was approved by the Department of Commerce on July 19, 1929, to give ground and flying instruction leading to private, limited commercial and transport pilots' licenses. The certificate also included approval of the ground school training given by Pacific Technical University.

The equipment at the university includes a large variety of airplanes, engine test stands, magneto-testing machines and me-

(Continued on next page)

## THE WORK OF THE CALIFORNIA AERONAUTIC SAFETY COMMITTEE

**T**HE Aeronautic Safety Committee of the California Inspection Rating Bureau was organized at a meeting of the General Committee on Revision of Safety Orders at Los Angeles, Calif., on March 25th of this year, called under authority of the Industrial Accident Commission of California, to study accident hazards in aviation. The meeting was attended by approximately thirty safety engineers and inspectors of the various insurance companies writing workmen's compensation insurance in California.

The Aeronautic Safety Committee was appointed to devote its attention exclusively to the aeronautic orders. The committee appointed was as follows: Robert A. Trow, chairman, Capt. Francis P. Fletcher and Thomas McDermott. The first meeting of the Aeronautic Safety Committee was held at Los Angeles on April 12th. As a result of this meeting approximately sixty letters were dispatched to organizations in the aviation industry in the United States and Europe, both private and governmental, requesting information on aviation safety precautions, to be studied as examples and suggestions for the organization of safety regulations for California. Mr. Trow, as chairman of the Aeronautic Safety Committee,

visited aeronautical manufacturing plants and airports throughout California during the past summer, collecting data on safety precautions and discussing the subject with the personnel of the organizations visited.

At a meeting of the committee held on October 10th, nine sub-committees were appointed by the Aeronautic Safety Committee to represent the various divisions of the aeronautical industry, as follows: airport and field operations, flying schools, ground schools, airplane engine manufacturing, airplane construction, maintenance, inspection and repair of heavier-than-air craft, flight operations, lighter-than-air craft, air traffic and safety of life and cargo. Each of the nine committees appointed will consist of three members, with the exception of the committee on lighter-than-air craft, which will consist of five members.

Two resolutions were passed at the meeting: that the United States Department of Commerce regulations were to be made the basis of a revision of the Aeronautic Safety Orders; and that the General Committee of the California Inspection Rating Bureau would cooperate as a unit with the aeronautical industry and with the California Aviation Commission.



# The Great Air Lines of the West

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## RICHFIELD GASOLINE



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STANDARD AIR LINES

MID-CONTINENT AIR EXPRESS

***Every major commercial air line in the Western United States, catering to passenger transportation business is included in this group . . . ALL use Richfield exclusively!***

THESE great air lines depend on Richfield Gasoline to carry them safely through ever-changing flying conditions... through rain and snow, in blistering desert heat . . . jumping from sea level to hurdle mountain peaks at altitudes of more than 12,000 feet. Without exception, they have found the famous "Gasoline of Power" more than satisfactory in meeting the grueling demands of day-in and day-out flying service.

Richfield Aviation products and service are available throughout the West and at manypoints in the East. Use Richfield Gasoline and Richlube Motor Oil in your own equipment for maximum performance.



### RICHFIELD OIL COMPANY

Richfield Building	.	.	.	Los Angeles
Chanin Building	.	.	.	New York

# RICHFIELD



(Continued from preceding page)

mechanical school equipment. This school is located in concrete and brick structures near Ryan Field. The ground school training gives 355 hours at laboratory, shop and lecture work during a four-month period. The course includes aerodynamics, construction and repairing of airplanes, aircraft engines, parachute construction and maintenance, navigation, radio, meteorology, instruments, air commerce regulations, trouble shooting, airplane welding and airplane shop practice.

The private pilot's course requires 20 hours of flying, ten hours dual and ten hours solo, and includes 195 hours of ground school. The course is also given without ground school instruction, but is recommended only to those who have had ground school training. An examination on ground school subjects must be passed for entrance to this course. The limited commercial course requires 50 hours of flying instruction, 15 hours being dual and 35 hours solo, and includes 355 hours of lecture, laboratory and shop work with classroom training for airplane engine and airplane mechanic's license. The limited commercial course may be taken without the ground school curriculum, but an examination on ground school subjects is an entrance requirement for this course. The transport pilot's course covers primary and advanced flying instruction and includes 200 hours of flying and a complete ground school course. Flight time includes 35 hours of dual and 165 hours of solo which includes ten hours night flying and ten hours of cabin plane flying. An advanced course is open to War-time pilots and others who have had previous flight training, and may be taken with or without the ground school course. The ground school course may be taken without flying courses and includes 355 hours of instruction.

Dual flight instruction is given with the Gosport speaking tube and parachutes are provided advanced students. Every flying student receives a certified log book of his flying time upon the completion of his course. Six different types of planes are maintained for student instruction.

## CONTACTS

[By F. E. SAMUELS]

### The All-California Goodwill Tour

THE All-California Goodwill Tour took off from the Los Angeles Metropolitan Airport, Monday, November 4th, with military precision, for a four-day tour of twelve California cities. The tour was arranged under the auspices of the Los Angeles Junior Chamber of Commerce. Forty-one ships started from Los Angeles on the trip and were augmented from town to town, until at one point of stop there were fifty-two ships on the starting line. Nearly seventy pilots and two hundred passengers made the trip without an accident.

The fleet was commanded by C. F. Leinesch, head of the aviation division of the Union Oil Company, who divided the planes into three divisions. Class A, holding its speed down to 75 miles an hour, was captained by Arthur C. Goebel in a Taper-Wing Waco, and included Rufus Pilcher, piloting a Travel Air, Dudley Steele, head of the aviation division of the Richfield Oil Company, in his new Stearman, W. E. Carey, in a Travel Air, Gordon Mound, piloting a Kinner-powered Fleet, C. A. Hussey in a Spartan, Margaret Perry, also piloting a Spartan, Robert Bystarkey in a Kinner-engined Travel Air, Al A. La Bruse in a Kreutzer Air-Coach, Vera Dawn Walker, piloting a Swallow, C. A. Burrows with a Curtiss Robin, R. F. Le Roy in an Axelsson-engined Travel Air, W. A. Williams with an Eaglerock, Earl Ovington in his new Roamair, Don Cobb in an Aeromarine Klemm, J. C. Newsome in a Kari-Keen, Jeff Warren flying a Barling, Walter Hawkins piloting a Great Lakes, M. C. Lovett with another Travel Air and Paul B. Wall in a Curtiss Robin.

Class B was captained by Mike Doolin flying a Boeing, and included a Waco flown by Don McKee, a Curtiss Robin by Walter Murphy, a Stearman by Roy Minor, a Waco flown by Arthur Tallies, another Waco by W. F. Hazen, a Timm Collegiate flown by Al Larry, a Fairchild by Ed McGruder, a Consolidated P. T., by Joe Davidson and a

Fokker Super Universal, which was the official American Legion plane of the tour, was flown by Paul E. Richter.

Class C included the trimotored Fokker of the Richfield Oil Company, which carried the officials of the tour. It was flown by Tommy Fowler. A Bach Air Yacht, official guest plane of the tour, was flown by Waldo Waterman. A Maddux Air Line Ford, flown by Tommy Tomlinson, was the official press plane. A Bellanca cabin plane was flown by Bob Larsen, J. B. Alexander flew a Fairchild 71, C. F. Leinesch a Travel Air and Florence Lowe Barnes also flew a Travel Air.

The cities visited were: Santa Maria, Salinas and Oakland the first day; Tuesday, San Francisco, Sacramento and Fresno; Wednesday, Visalia, Bakersfield, San Bernardino and on to El Centro for the third over-night stop; Thursday, leaving El Centro, we crossed the mountains to Long Beach, then to the Los Angeles Metropolitan Airport, where the tour disbanded. The high spots of the tour included the reception given the fliers at Sacramento, where Gov. C. C. Young addressed the pilots and guests at lunch. At Fresno a banquet was given by the American Legion, and the Aviation Post of the Legion was entertained. At El Centro, the last night of the tour, everyone was well entertained, as Mexicali was only a short distance and busses were running all night.

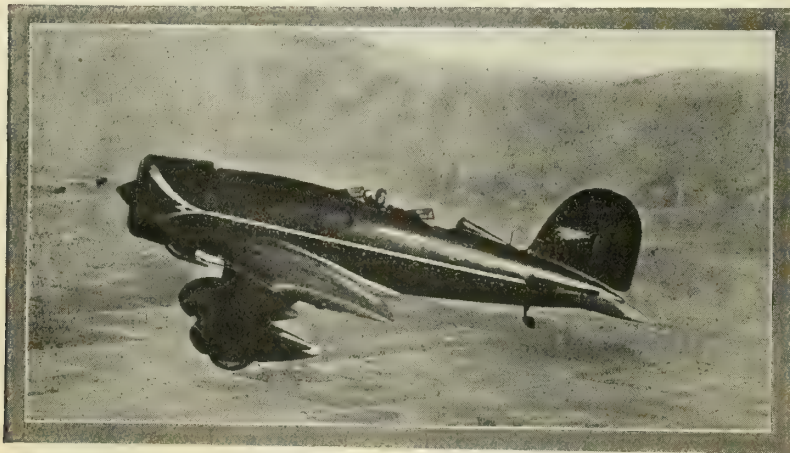
During the tour I flew with Waldo Waterman in the Bach Air Yacht and I can't say too much in praise of the pleasant flights that we made over the route. I also had an opportunity to fly with Lee Shoenhair in the Goodrich Lockheed plane, and it surely is fast enough! Credit must be given Mike Doolin for the wonderful formation flights that he captained along the route and over the different airports; to Leinesch, who commanded the flight; to Kennedy Ellsworth, president of the Junior Chamber of Commerce, who arranged for entertainment with the different Chambers of Commerce; and to that tireless worker Joe Nikrent, the N.A.A. official timer and starter, who successfully started and landed nearly fifty planes twelve times in less than four days, without an accident of any kind and sometimes with the dust so thick it could be cut.

## CALIFORNIA

PRELIMINARY tests of the "mystery ship" built for Col. Charles A. Lindbergh's private use have been completed by the Lockheed Aircraft Corporation at the Los Angeles factory. Results of the tests indicated a high speed of 190 miles per hour.

The ship is an open cockpit, two-place, low-wing monoplane, streamlined in design and powered with a Wasp 450-horsepower engine. The engine is housed in by an N.A.C.A. cowl and the landing gear is equipped with pants. The plane is painted red with a line of contrasting color down the fuselage.

(Continued on next page)



Low-wing two-place Lockheed monoplane powered by a Wasp engine built for Col. Charles A. Lindbergh. It has a high speed of 190 miles per hour



It will pay you to train **THIS WINTER** with

# RYAN



*In sunny*

## SAN DIEGO, CALIFORNIA

**Because:**

1. The man who trains here during the coming *warm* Winter months will be prepared to enter aviation next Spring.
2. Summer time is always aviation's busiest season--(get ready for next Summer NOW and you'll gain an extra season of pay and experience).
3. San Diego, California, is America's outstanding Summer and Winter Resort--356 Flying Days is the annual average.
4. While other sections of the United States are snow-bound, Ryan students thrill to the comfort and joys of perfect flying weather--and the experience of training in 15 licensed planes, large and small, open and closed, of the most modern types.
5. The T. C. Ryan Flying School was one of the first to receive the COMPLETE approval of the U. S. Dept. of Commerce for training Transport, as well as Limited Commercial and Private pilots.
6. Ryan ground training is outstanding for its thoroughness--offering 400 hours of theoretical and practical training (more

than four times the minimum requirements for the U. S. Dept. of Commerce Transport License).

7. Ryan Flying and ground instructors are of the highest type, men who are masters of their particular professions. Seven ground instructors are employed for technical training alone.

8. Ryan Airport, serving three huge transport companies with 12 to 15 tri-motor planes on daily schedules, gives Ryan students unexcelled opportunities for contact with major aeronautical activities.

9. The Government's largest navy and army aviation base, near Ryan Airport, gives additional educational advantages to Ryan students.

10. Employers recognize and prefer graduates from a school with many years of experience and an established reputation for quality training. Ryan reputation is recognized internationally.



NOTE: All training at the Ryan Flying School is given under the personal supervision of T. Claude Ryan, original designer and builder of Ryan monoplanes; founder of Ryan Airlines, Ryan Flying Company; president of T. C. Ryan Flying School and T. C. Ryan Aeronautical Corporation.

THIS COUPON WILL BRING YOU OUR NEW CATALOG

The T. C. Ryan Flying School invites the attention of those who are interested only in the highest standards of aeronautical training. Ryan Approved Training costs less than training at some schools that have not been approved.

Courses include:

- \*The Transport Course ..... 200 Flying Hours
- \*The Commercial Course ..... 50 Flying Hours
- †The Private Pilot's Course ..... 20 Flying Hours

Also Refresher Courses for Wartime Pilots and those who have had flight training at other schools.

\*These courses include 400 hours of Ground School with Lectures, Laboratory and Shop Practice.  
†The Private Pilot's Course includes 200 hours of Ground School Training.

T. C. Ryan Flying School, Dept. H, Ryan Airport. San Diego, California. Please send me your illustrated catalog.

NAME

ADDRESS

AGE

Say you saw it in AERO DIGEST



(California News continued)

**A**UTHORITY has been granted for the construction of three more units of the new Western Air Express Airport at Los Angeles, according to officials of the airline organization. These include a gateway house, leading to the field proper, a power house and a 35-car capacity garage. The latter will be for the accommodation of patrons who wish to drive to the field, make a round trip by air, and have their machines ready when they return. The power house will give positive assurance that lights used for night landings and take-offs will not fail.

**F**IVE FOKKER F-32 passenger ships have been ordered by Western Air Express, the first scheduled for delivery on December first. The first of six F-14 planes, the new type mail and passenger planes produced by the Fokker Aircraft Corporation, has been delivered to Western Air Express. These planes will be placed in service on the Los Angeles-Salt Lake City airline.

After all the ships ordered are housed on the new \$1,500,000 airport of Western Air Express at Los Angeles, it will bring the total of planes of the organization to 48.

#### Aero Corporation of California Plans National Chain of Flying Schools

**A**NNOUNCEMENT of a national chain of flying schools with headquarters in Los Angeles, was made recently by Jack Frye, president of the Aero Corporation of California. Simultaneously with the announcement, Mr. Frye stated that the name of the Aero Corporation of California aviation school at Los Angeles would be changed to that of the Standard Flying School. The Standard Flying School will continue to be a division of the Aero Corporation of California. The program calls for schools to be placed first in the major cities of California, Arizona, New Mexico and Texas. According to present plans, ten schools will be established within the next year.

The Aero Corporation of California school at Los Angeles will serve as the university and advanced training school for the entire national chain. It has graduated over 1,500 students during the past five and one-half years of operation, and was one of the first five schools in the United States to receive government approval. The system

of training that will be used throughout the entire chain of schools will be known as the Standard System of training and is the development of the Aero Corporation of California over the five and one-half year period.

Students attending other schools of the chain in other parts of the country will come to the Los Angeles school for their advanced instruction and completion of training. Each school in the chain will be a licensed and accredited school and will be operated according to Department of Commerce regulations, Mr. Frye announced.

**T**HE Aviators' Ball of the American Legion Aviator's Post No. 350 of Los Angeles was held at the Ambassador Hotel, Los Angeles, on November 15. The ballroom was decorated to resemble an airport with lights, wind cone, a siren, and the orchestra was attired in flying suits, helmets and goggles.

Included in the activities of Aviator's Post No. 350 of the American Legion during the past year is a special reception sponsored for Dr. Hugo Eckener when the *Graf Zeppelin* landed at Los Angeles on its world flight; the sponsorship of a day at the Western Aircraft Show; the direction of a squadron flight over the Coliseum on Armistice Day; and the handling of a plane entered in the California State Air Tour which was held in conjunction with the Western Aircraft Show.

The ship entered in the tour by the Post was a Super-Universal Fokker powered with a Hornet engine. It was furnished by Paul Richter, a member of the Post, and vice president of the Aero Corporation of California and Standard Air Lines, and was piloted by him throughout the tour.

**T**HE name of the San Diego Air Service Corporation, located at Lindbergh Field, San Diego, Calif., has been changed to the Airtech Flying Service, Ltd.

**C**ONSTRUCTION of a \$100,000 factory by the Irving Air Chute Company has been completed at the Grand Central Air Terminal, Glendale, Calif. The building is a brick structure, surmounted by a domed roof built in the shape of a parachute opened in descent. The factory will have a manufacturing capacity of 35 parachutes per week,

and will be under the direction of Guy Ball, formerly of the McCook experimental base at Dayton, Ohio.

**C**LASSES in glider instruction have been inaugurated at the Airtech School of Aviation, San Diego, Calif., under the supervision of W. H. Bowlus. Mr. Bowlus conducts a 10-hour course that includes instruction in flying the primary type of glider and the more advanced sail-plane type.

Mr. Bowlus gives preliminary instruction to his students on a primary glider towed behind an automobile. Glider students will then be taken to a hill adjacent to San Diego where they will receive actual experience in piloting this plane. Instruction in cockpit sail-planes will follow and the final stage of instruction will include hops at Point Loma where Mr. Bowlus recently made a glider flight of one hour 21 minutes and 9 4/5 seconds.

**T**HREE million dollars will be expended on the improvement of Grand Central Air Terminal, Los Angeles, by Curtiss Airports Corporation, according to William F. Carey, president. Among the projects included in the development of Grand Central Air Terminal are a \$100,000 cafe building upon which construction work has started, and a beacon tower equipped with a ceiling height indicator, which has been completed. The three million dollar expenditure for the development of the terminal has been appropriated from a \$20,000,000 fund which is to be expended by Curtiss Airports Corporation for the improvement of airports under its supervision.

**O**RGANIZED to loan money to students to cover tuition for aeronautical and trade school training, the Students Aviation and Trade Schools Finance Company recently began operations at San Diego, Calif. The company was formed by J. Russell Jones and Robert Huntley, former registrar and secretary of Pacific Technical University, and operates under the name of the Huntley-Jones System of Educational Service.

Applications for loans may be made by students enrolling in any licensed aeronautical, trade school or business college. Loans are repaid by students in monthly installments beginning from thirty to sixty days

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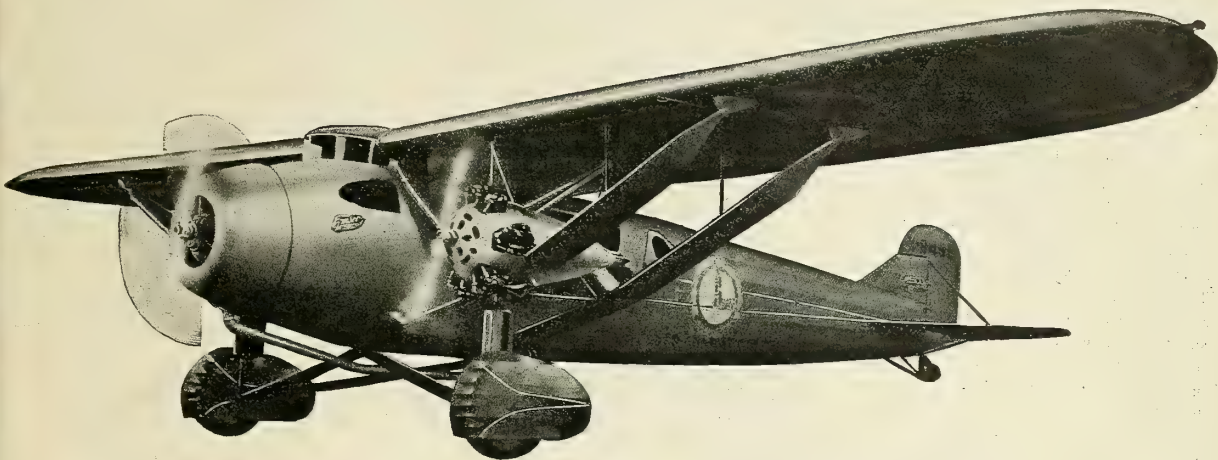
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**Calif. Aerial Transport**  
LOS ANGELES CALIFORNIA

# California Panel & Veneer Mill Service



## SERVES EMSCO

California Panel and Veneer *Mill Service* enabled this company to accept and fulfill, on specified dates, the largest single shipment of chrome molybdenum tubing ever placed by an aircraft manufacturer in the West. The order was placed by the Emsco Aircraft Company, manufacturers of the Emsco Challenger and the Emsco Cirrus.

Your organization should become fully acquainted with California Panel *Mill Service*! It is the most efficient and advantageous method of purchasing production materials!

Your immediate requirements are cared for by instant shipment from our extensive stocks. The balance of your order is forwarded to the mills for shipment direct to your plant. California Panel and Veneer follow-up service assures the prompt arrival of all materials at your factory on your specified date. On your next order for production materials, take advantage of California Panel & Veneer *Mill Service*. Our representative will gladly explain details.

*Mill Representatives for  
Manufacturers of the  
Following Production  
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Strip Steel  
Safety Belts  
Nickel Steel Bolts  
Chrome Molybdenum Tubing  
Haskelite and Co-Ve-Co Plywood  
Brass Nails  
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*(California News continued)*

after graduation, allowing the student time in which to secure employment before payments mature. The company plans to establish a chain of similar companies throughout the country, affiliated with recognized educational institutions.

**ALAMEDA**

[HOWARD V. WALDORF]

THE voters of Alameda on Nov. 5 approved the establishment of a \$280,000 yacht harbor and seaplane base at the Alameda Airport. The vote was cast on a plan for the leasing of 50 acres of submerged land on the west side of the airport in return for the relinquishing possession of 53 acres on the east side of the flying field. The yacht harbor and seaplane base is to be 2,000 feet long and from 800 to 1,200 feet in width, with an old passenger vessel, anchored at its entrance as a clubhouse. Lochiel King was awarded the construction contract.

**CAPT. HARRY CLAIBORNE**, World war flier and former head of the southern California staff of the Curtiss-Wright Flying Service, has been appointed director of the northern California division of the Curtiss-Wright organization. He replaces Capt. F. M. Bartlett who has been appointed to direct the \$5,000,000 development program under way at Alameda Airport and the training field at San Mateo, south of San Francisco.

NIGHT lighting equipment, a unit of the \$3,000,000 development program, is being installed at Alameda Airport. The equipment includes one beacon light, two floodlights, one ceiling light, and 20 boundary lights.

**OAKLAND**

[HOWARD V. WALDORF]

COINCIDENT with the taking possession of the newly completed Hangar No. 5 at Oakland Municipal Airport for the Boeing School of Aeronautics, the Boeing System took an option to lease 10 acres of land at the flying field. Taken at a price of \$1,000, the option provides that if it is exercised

within a year, the Boeing System is to pay a rental of \$3,000. Appraising the entire airport on this basis, the figure represents a \$3,500,000 land valuation increase since the Oakland Municipal Airport was established two years ago.

Under the option, the Boeing System agrees to erect buildings valued at \$100,000 during the first year following the exercise of the option. The lease for a 25-year period provides that any buildings erected may be used in the repair, construction and storage of airplanes and other aeronautical pursuits. The location of the land, adjoining the company's new headquarters at the flying field provides watery connections. For Hangar No. 5 and the westerly half of Hangar No. 4, the Boeing System agreed to pay an annual rental of \$14,000.

Hangar No. 5 is the most elaborate and complete of all the hangars at the Oakland flying field. Measuring 300 feet by 150 feet, and including a two-story office building, the structure was erected at a cost of approximately \$150,000. The office building houses the Boeing School of Aeronautics and offices of the Boeing Air Transport and Pacific Air Transport.

One of the outstanding features of the structure is the unique method used in protecting passengers and spectators. A glassed-in bridge, extending across the hangar, under the roof, connects the ticket offices with an observation and waiting room on the flying field side of the building. From this room, stairs and a closed-in canopy lead to the waiting airplanes. The canopy rolls to the cabin doors of the planes.

TO aid in the forecasting of storms over the Sierra Mountains, teletype printers have been installed between Oakland Municipal Airport and Reno, Nevada. Through the printers weather data from the intermediate stations along the route is gathered by the weather bureau force at the Oakland airport.

**Two Speed Services Planned Between Oakland Airport and San Francisco**

TWO high speed passenger, express and mail services connecting Oakland Municipal Airport and San Francisco are scheduled for inauguration before the first of the year. The services are the speed boat service of

Fahy and McNulty, recently granted a certificate of public convenience by the California State Railroad Commission, and the amphibion service planned by the Curtiss-Wright Flying Service.

The Fahy and McNulty firm will use a fast speedboat powered with two 200-horsepower motors, and equipped with a sound-proof airplane cabin to seat 32 passengers. Test trips have been made between the airport dock and the foot of Market Street, San Francisco, in 29 minutes.

The first of a fleet of Ireland amphibions for the projected Curtiss-Wright service has arrived and is now making demonstration flights. Flying time between the Oakland airport and China basin, ten minutes from the heart of San Francisco, is eight minutes. Charles G. Shone, former engineer of the State railroad commission, is in charge of the proposed Curtiss trans-bay service. Larger planes will be ordered for the service next spring.

**HAWAII**

[VERNA HINKLEY]

THE Army Air Corps in Hawaii is getting some modern ships. Nine Keystone bombers, equipped with Wright Cyclone engines, have been assigned to this department. Two are now in Hawaii with seven to follow in the near future. The planes will be based at Luke Field which now has Keystones, powered with Liberty engines, and Martin bombers, similarly powered.

THERE is a great deal of activity at John Rodgers Airport. Two paved runways are being constructed, two hangars are going up, the county of Honolulu is building a permanent road from the main highway into the field and bids have been received on the supply of water and electric power. All of the improvements are to be completed by December.

HAWAII'S first inter-island air transport service was inaugurated November 11, by the Inter-Island Airways, Ltd., at the John Rodgers Airport which is west of the city of Honolulu. Appropriate ceremonies accompanied the departure of two twin-engined Sikorsky amphibions for the island of Hilo, 200 miles away. Service aircraft

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escorted the two ships out to the channel between Oahu and Molokai. Pilots of the Inter-Island Airways are Carl A. Cover, Army aviator, C. I. Elliott, formerly at the Naval Air Station at Pearl Harbor, and B. R. Ertwine, formerly stationed at Luke Field.

## NORTHWEST

[F. K. HASKELL]

A \$50,000 airplane service and repair plant will be constructed at Swan Island Airport at Portland, Oregon, by the Aircraft Industries, Ltd. The new building will be part of a coast chain; similar buildings are to be erected at the larger cities along the Pacific Coast.

TWO thousand people attended the recent dedication of the Newport, Wash., airport. The dedicatory address was made by

Lawrence H. Brown of the Spokane chamber of commerce aviation committee and the speech of presentation to the public by Sidney W. Rogers for the town council. The field is municipally owned and within the town limits. The single runway on the field is 2,000 feet long and 400 feet wide.

CAPT. W. B. VOORTMEYER is giving instruction in navigation and meteorology to air mail pilots of the Varney Air Lines at Portland, Ore. Captain Voortmeyer will teach the dead reckoning method of aerial navigation. The captain charted the course of Capt. Wilkins to the north pole, Capt. Kingsford-Smith to Australia and the Dole flight to Hawaii.

A CONTRACT for air-mapping Seattle and its environs has been awarded to Aerial Mapping Engineers, Inc., of Port-

land, Ore. According to Capt. Frank Mercer, head of the concern, the mapping will embrace a total of 120 square miles. One set of photographs will be taken from an altitude of 12,200 feet, giving a scale of 1,000 feet to the inch, and another from 6,000 feet, giving a scale of 200 feet to the inch.

HOPE that Oregon will soon adopt and observe the standards of the Aeronautics Branch of the United States Department of Commerce and prohibit all pilots from flying unless they have Federal licenses, was voiced recently by E. E. Moun-ton, Government supervising inspector. According to Mr. Moun-ton, Oregon, under its aircraft statutes, licenses planes and pilots, regardless of their Federal standing. Should the policy be continued, the state

(Continued on next page)

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(Northwest News Continued)

would eventually become the dumping ground for all unlicensed planes and fliers, he said. About one-half of the fliers in Oregon are operating without Federal licenses.

## WASHINGTON

[C. M. LITTELJOHN]

**T**O secure greater efficiency, the engineers of the Boeing Airplane Company at Seattle, have recently increased the performance of the Boeing six-place flying boat, by equipping the Wasp engines with a three-bladed propeller. The speed of this flying boat has been raised from 115 miles per hour to 133 miles per hour, and the service ceiling has been increased from 12,000 to 14,000 feet.

**N**EW offices were recently opened in Seattle by the West Coast Air Transport Corporation. M. F. Nickell, who was formerly passenger agent at the Portland office, has been transferred to Seattle to take charge of the new office. Twelve-passenger Fokker cabin planes are used by this organization on lines down the coast from Seattle.

**A** NEW and comprehensive course in aerodynamics was opened recently at the University of Washington at Seattle. Commander P. H. Rice is the instructor of the new classes formed. From each class fifteen showing the highest proficiency will be selected for a summer training period to be held annually at the Seattle Naval Air Station at Sand Point, under the direction of Commander John D. P. Rice, commandant of the station.

**P**LANE and passenger service between Seattle, Vancouver, and Victoria, was recently inaugurated by the Canadian subsidiary of the Alaska-Washington Airways. Two daily round trip flights of the three cities are being made during the winter.

**T**HE Seattle Aviation Country Club, of Seattle, was recently incorporated. Incorporators of the club are Donald G. Graham, E. T. Kennedy, Thomas D. Stimson, H. A. Munter, John D. Price, and C. W. Stimson.

**A**N extensive system of radiophone installation will be made along the Boeing System air mail, express and passenger routes at an early date. Twenty-two cities along the Boeing lines are designated as the locations for ground radiophone stations which will enable the pilot to keep in touch with observers at all times. New plane and ground radio equipment for the new installations is being produced in the Philadelphia plant of the Western Electric Company. Pacific Coast stations are planned for operation shortly after the first of the year, and the transcontinental stations will be set up and operated before that time.

**A** NEW hangar was recommended recently for the municipal airport at Seattle by Dave Logg, airport manager. He has requested that a hangar at least 126 feet between walls, with an inside accommodation of 118 feet, be constructed next year to care for the growing requirements for airplane accommodations at the field.

## IDAHO

[GLEN PERRINS]

**C**ONSTRUCTION of the Federal radio beacon station in Boise, Idaho, for use in air mail service, will be completed in the near future. A new 200-foot water channel, sufficient to handle the usual spring flood, is being constructed near the airport and other improvements are being made. Bids on construction of an emergency landing field between Boise and Mountain Home, one of the first this state has outlined under the new air commerce act, will be opened soon. The field covers 56 acres.

**W**ORK will start at once at the Nampa, Idaho, airport on a program of construction to improve the field. Telephone lines and electricity will be carried underground to the field giving clear approaches in all directions. The field will be lighted with boundary, flood, and beacon lights.

**A**PPROXIMATELY \$2,500 to \$3,000 will be spent in grading the landing field at the Idaho Falls, Idaho, Municipal Airport, the work to be finished before 1930. A tower is being erected for a beacon light.

## UTAH

[GLEN PERRINS]

**P**LANs for the establishment of a radiophone ground station at the Salt Lake City Municipal Airport for communication with pilots on air mail and passenger planes of the Boeing System have been announced by John M. Maxwell, field manager for the company. The equipment is expected by January 1.

**A** CERTIFICATE of consolidation of the Columbia Airways, Inc., and the Aeromotive Service, Inc., both of Salt Lake City, has been recorded. At the same time a certificate of increase of stock of the Columbia Airways, Inc., the new name of the merged firm, from \$50,000 to \$250,000 was filed. Clair O. Brunner, president of the Aeromotive Service, Inc., is president of the new firm.

**B**USINESS on the Great Falls-Salt Lake line of the National Parks Airways Company is increasing, according to Alfred Frank, president. As contracts for lighting the route between Salt Lake and Pocatello have been let, and a survey for lighting between Pocatello and Great Falls, Montana, has been completed, officers of the concern plan a night schedule.

Ogden, Utah, will start work immediately to equip its airport with lights suitable for night landings, a low bid of \$3,287 having been accepted for the work. This action was made when it appeared that the National Parks Airways would petition the Post Office Department to cancel scheduled stops in that city, due to inability to land at night on the local field.

**A**N L-shaped tract of land near Brigham, Utah, has been secured for an emergency landing field. Lighting and other equipment will soon be installed for the field.

**A**RTICLES of incorporation for the Airport Development Company were filed in Ogden, Utah, recently. The company, which has taken over a large area of land lying near the Ogden Airport, is capitalized for \$25,000. Paul L. Newmyer is president of the company.

(Continued on next page)

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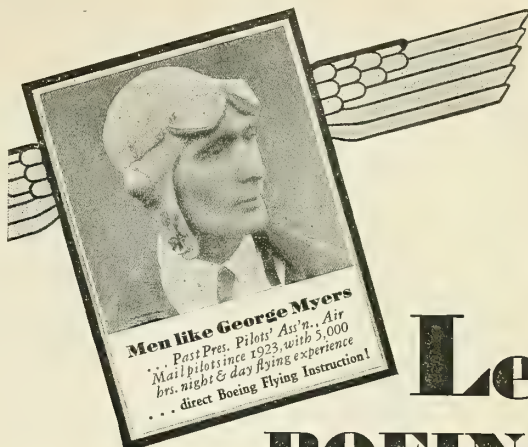
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(Utah News Continued)

THE town of Price, Utah, received its first air service recently when the new route from Vernal to Price, via Roosevelt, Myton and Duchesne was inaugurated by the Intermountain Flying Company. The firm is maintaining a daily express and passenger service between Roosevelt, Uintah basin points, Vernal, Provo, Ogden and Salt Lake City.

THE first unit of extensive additions to lighting at the Salt Lake City Airport was turned on recently. The addition consists of a lighted circle 100 feet in diameter in the middle of the landing field. It is a cement circle, flush with the ground, with 31 incandescent lamps of 60 watts each sunk in the concrete so that a ship may run over the circle. Both sides of the runways will be similarly lighted. Nearly all lines operating out of Salt Lake are now on night schedules. Gilbert T. Rich is the new airport manager.

THE National Parks Airways, Inc., of Salt Lake City, Utah, plans to bring an action to resist payment of the tax on gasoline used by airlines in Utah. A protest has been made against some of the gas taxes due the state under its levy of 3.5 cents per gallon. Payment will be resisted on the ground that taxes are an unjust burden on interstate commerce. It is contended by the counsel for the airways that under a recent decision of the Supreme Court of the United States, a state cannot impose such a tax on interstate commerce.

## COLORADO

[IRA R. ALEXANDER]

P. EMERSON GLAFCKE, of Denver, has developed a variable propeller, designed to permit the pilot to change the blade pitch while in flight. Glafcke, formerly an officer with the Second Regiment, U. S. Engineers, states that after altitude and speed have been gained the propeller pitch may be increased, giving the blades a degree of leverage on the air which would not be safe while taking off.

A GROUP of Alamosa, Colo., citizens recently filed articles of incorporation with the Secretary of State for the San Luis Airways, Inc., formed to carry on air transportation in Alamosa. The organizers are J. D. O'Haver, Harry J. Melter and Charles D. Smith.

THE Platte Valley Airways, Inc., of Greeley, Colo., filed articles of incorporation with the Secretary of State recently. The organizers of the Platte Valley firm are Joseph L. Thompson, George H. Loustalet and Earl A. White. The company is capitalized at \$20,000.

THE Fleetcraft Airplane Company of Lincoln, Nebraska, has purchased a 200-acre tract on the municipal airport at Pueblo, Colorado, and has started the construction of a factory on the new site. The Fleetcraft plant will be moved from Lincoln to Pueblo upon the completion of the

new plant. Officers of the Fleetcraft Airplane Company are: John B. Moore, president; D. J. Coyler, vice president; D. A. Sanders, secretary-treasurer; and D. W. MacMeekin and J. P. Engel, directors.

## ARIZONA

[HAROLD G. WILSON]

SCENIC AIRWAYS, INC., has been given permission by the Arizona State Corporation Commission to establish a regularly scheduled airplane line from Nogales, on the Mexican border to Fredonia, on the Arizona-Utah line. Tucson and Phoenix are to be included as stopping points, although the company will not take passengers from either city with the other as a destination, as they are already served by Standard Airlines. Scenic Airways has acquired, by purchase, the municipal airport at Chandler.

VOICE broadcasts from the Oakland airway radio station have been doubled. On each hour a collection of weather reports from the various terminals is broadcast, and each half hour reports from the various sectors are sent.

AN emergency landing field is being constructed at Meteor Junction, 20 miles west of Winslow, by the Transcontinental Air Transport company. It is one of a series of emergency landing fields the company is constructing.

(Continued on next page)



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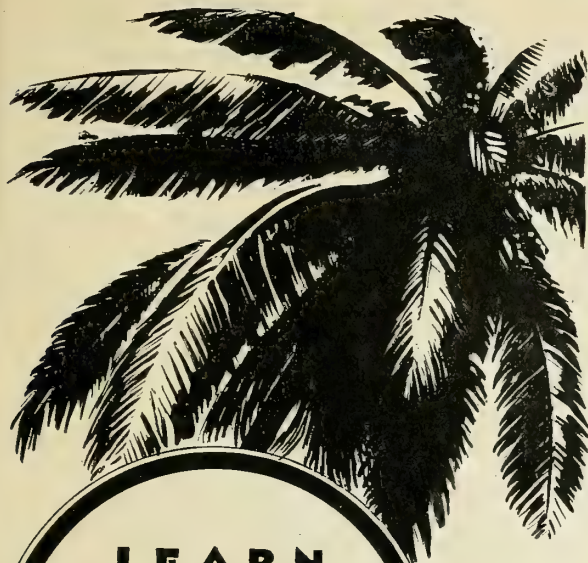


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(Arizona News Continued)

pany is establishing along its northern Arizona line.

TWO \$25,000 bond issues are expected soon to supply funds for improvements on the Tucson and Yuma fields. Both cities have approved bonds in this amount. Tucson will spend the money for an air depot, completion of the lighting system, and treatment of the soil to lay the dust. Yuma plans to use the money for a hangar, concrete runways, guide lights and a machine shop.

NEGOTIATIONS are reported under way whereby the newly formed Union Air Lines will take over Scenic Airways. Leslie P. Arnold, round-the-world Army flier is president of Union Air Lines which was formed as a holding company for Southwest Air Service, at Tucson, Aero Corporation of Arizona at Phoenix and two other companies in the state. The company is seeking to establish a north-south airline from Nogales on the Mexican border to Salt Lake City, connecting with three cross-country lines.

A GOVERNMENT meteorological station for aviation has been established at Phoenix, Ariz., George M. French, Government meteorologist from San Francisco being in charge of the work. Regular weather data is now supplied companies operating through the Phoenix region. There are two other meteorological stations in the state, at Tucson and Yuma, these

being on the U. S. Army model airway across the southern part of the state.

PREPARATIONS to extend the Continental Air Express service to the Pacific Northwest and Salt Lake City are nearing completion according to E. C. Williams, division manager at Alameda Airport. The company now operates a twice daily service between Alameda and Mexico.

AFTER conferences and discussions covering the past 3 years, Alamosa is to have an airport. A tract of 960 acres lying just west of the residential section has been purchased. Two one-mile runways are being built, the city and county defraying the expense. The field will be completed shortly.

## CANAL ZONE

[J. F. H.]

DREDGING of Allbrook Field, the new Army flying field on the Pacific side of the Panama Canal, is progressing, and before many months planes of all sizes should be able to land without difficulty. The heavy rains prevalent during the fall season have slowed up the work to some extent, but not enough to affect the plans of the contractors.

LIEUTENANTS JOHNNY JONES and Con Mayhue, attached to the France Field flying group, have been ordered detached for one month as instructors to the

army air service of the Republic of Salvador. The Salvadorian government has three new Waco planes to augment its present corps. Permission to secure these two Army pilots was obtained through the U. S. War Department.

EDUARDO A. ICAZA, Panama business man, was elected president of the Panama chapter of the National Aeronautic Association for the coming year at the annual election held November 1 in Panama City. Dr. James Zetek was elected vice president; John O. Collins, secretary; and Moses Cardoze, Jr., treasurer. Lieutenant Robert Zane, Captain Laurence MacNair, and Edward Linares, Jr., were elected to the board of governors.

FROM May 5 to November 1, the Isthmian Airways, Inc., carried over 3,000 passengers in their trans-canal service. They made 950 flights and carried 75,000 pounds of express baggage and cargo in their two Hamilton, all-metal seaplanes, equipped with Pratt and Whitney Hornet engines.

PANAMA'S national airport at Patilla Point, six miles from Panama City on the Pacific side of the Isthmus, is fast becoming one of the most modern and complete landing fields in Central or South America. Large transport planes have found no difficulty in landing or taking off during exceedingly heavy rains of the past few months. The government has already spent nearly \$500,000 on this field.

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# They demonstrated

## WACOS using Kendall Oil won first and second places.

Over twenty states and part of Canada, thru all kinds of weather, high over mountain ranges and close to the tree tops with strong headwinds whistling through the struts, John H. Livingstone flew his Whirlwind-powered WACO to victory in this year's Ford Reliability Tour. He covered the 5200-mile course at the unusually high average speed of 129.97 M.P.H., with Arthur J. Davis in another Whirlwind-powered WACO, in close competition all the way, averaging 129.82 M.P.H. What a tribute to skillful cross-country flying, to fine motors and to faultless lubrication were the magnificent scores recorded for these two pilots throughout the contest!

It is no mere coincidence that the winner and the runner-up in the Ford Reliability Tour flew the entire course with Kendall-lubricated motors. When a winning pilot comes in, you will almost always find Kendall Oil in his motor. And in this case Kendall Oil not only helped Livingstone and Davis win first and second places, but was also used exclusively by twenty of the twenty-five finishers—including eight of the first ten—in the 1929 Tour. Kendall Oil is truly a winner's oil, whether you are out to win trophies in a race, profits on an air line, or simply pleasure in flying.

John  
Livingstone  
The Winner  
in his  
winning  
WACO



Book-Cadillac Hotel

DETROIT

October 23, 1929.

Kendall Refining Co.,  
Bradford, Penna.

Attention - Mr. E. Shearer

Gentlemen:

In winning the National Air Tour, and one of the two perfect scores, the enthusiastic confidence of many prominent pilots in recommending Kendall Oil to me has been thoroughly justified by the brilliant performance of my motor under all throttle settings. Its smooth operation and excellent running under the grueling pace necessary to win this contest surely bespeaks the all-around character of the lubricating oil and converts me enthusiastically to Kendall.

With kindest personal regards, I am

Yours very truly,

John H. Livingstone



Book-Cadillac Hotel

DETROIT

October 22, 1929

Kendall Refining Company  
Bradford, Pa.

Attention - Mr. E. Shearer

Gentlemen:

I want you to know that it was with the greatest confidence I selected Kendall Oil for use in my motor in the National Air Tour in which I won second place. I knew that by using Kendall my oil troubles would be eliminated and the results I obtained show that my confidence in your product was fulfilled.

Sincerely yours,

Arthur J. Davis



ARTHUR DAVIS  
Second place  
in another  
WACO

## Why you should this

It has been demonstrated in the Arctic that KENDALL OIL gives just as good lubrication in frigid temperatures as it does under the varying conditions of a Ford Reliability Tour. Kendall will *not* congeal the minute the motor is shut off. It will flow to every bearing and friction surface, the instant the motor is started again. This relieves battery and starter of undue strain in cold weather and makes it unnecessary to drain and warm the oil between flights.

Kendall Oil is derived entirely from the Bradford grade of Pennsylvania Crude, of a purity so pronounced that no chemical treatment is used in the



# KENDALL

# reliability with KENDALL OIL

and  
**Kendall lubricated BELLANCAS**  
**led the single-motored cabin planes**

Sometimes roaring close to the ground at top speed, at other times hurtling through the upper reaches of Canada's cold skies, later streaking across the torrid, sun-drenched skies of semi-tropical Florida, George Haldeman and Bob Nagle certainly demonstrated the reliability of their Whirlwind-powered Bellanca Planes — and of Kendall Oil — in the 1929 Ford Tour.

What a test for motors and lubricants that long, grueling trip developed! Temperatures varied 60 degrees, between Canada and Florida. Terrific speeds were maintained. Headwinds necessitated wide-open-throttle flying much of the time. Haldeman's plane maintained an average speed of but five miles less than his fastest speed for the contest. Yet Kendall Oil stood up under this unusual punishment, helping the motors of both planes to maintain even oil pressure and constant temperature under every flying condition.

George Haldeman's letter on this page gives Kendall Oil full credit for its part in helping the two Bellancas win their splendid point scores in the Tour.

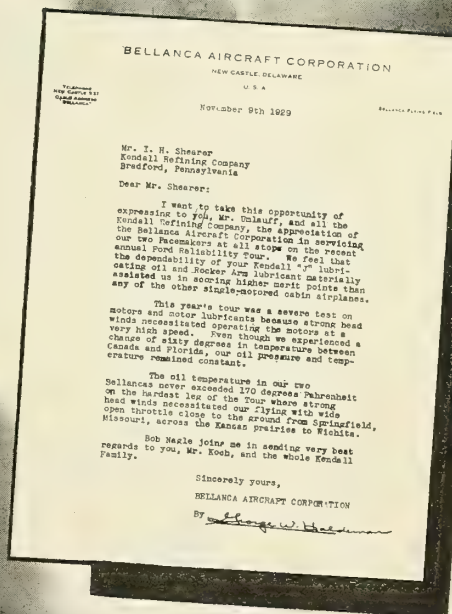
## use Kendall Oil Winter

refining. Because it is *all oil*, free from acids and other impurities, Kendall is slow to break down and gives longer service . . . the specified change period is thirty hours.

Try Kendall Oil this winter. Give it a real test. It will stand up for you just as it has for many winning pilots who have used it in races where speed and endurance made extra demands upon the fine qualities inherent in this remarkable lubricant. We will be glad to send you full information about Kendall Oil together with a list of airports where it may be obtained. Address, Aviation Division, Kendall Refining Company, Bradford, Pa.



GEO. W.  
HALDEMAN



Left: BOB NAGLE

Below: Bellanca which won highest score  
for single motored cabin planes.



# OIL

**MADE FROM 100%  
BRADFORD GRADE OF  
PENNSYLVANIA CRUDE**





# AERONAUTICAL INDUSTRY

## TWO NEW DIVISIONS FORMED IN AERONAUTICS BRANCH

TWO new departments have been created in the Aeronautics Branch of the Department of Commerce according to a recent announcement of Clarence M. Young, Assistant Secretary of Commerce for Aeronautics. The new departments of the Aeronautics Branch will be known as the Licensing and Inspection Service, and the Aeronautics Development Service. The work of the Branch will be classified under the two new groups in addition to the Airways Division which will continue to function as a division of the Aeronautics Branch, devoted to the problems of airways, airports, and the other physical accessories of airline operations.

Gilbert G. Budwig has been appointed Director of Licensing and Inspection, and Harry H. Blee, Director of Aeronautics Development. Mr. Budwig was formerly chief of the inspection work of the Aeronautics Branch. He is a captain in the Air Corps Reserve with the military rating of airplane pilot. Mr. Blee was formerly in charge of the airport activities of the Aeronautics Branch. He is a lieutenant colonel in the Air Corps Reserve with the military flying ratings of spherical balloon observer, pilot, and airship pilot. F. C. Hingsburg of the Bureau of Lighthouses will continue in his capacity as Chief Engineer of the Airways Division.

The work of the Licensing and Inspection Service includes all activities in connection with the approval of aircraft and subsequent licensing, the licensing of personnel and the approval of flying schools. The work of the Aeronautics Branch includes activities in connection with assisting communities in the selection and development of airports, the rating of airports, aeronautics research, the publication and dissemination of aeronautical information, the publication of air navigation maps, and the development of civil aeronautics.

The Airways Division will continue the work of establishing and maintaining civil airways, providing and operating suitable landing fields, beacon lights, weather and communication service, and other aids to aerial navigation.



Willfred C. Moore, who recently set a new high-speed record for light planes in an Inland sport monoplane

THE world's speed record for light airplanes of the first category was broken by Willfred C. Moore at Kansas City on November 4 when a speed of 123.17 miles per hour was obtained over a closed course of 100 kilometers. Moore flew an Inland Sport monoplane powered with a Warner Scarab engine with a load equivalent to the weight of a passenger.

The former record of 119.839 miles per hour was made by A. S. Butler in December, 1928, at Stag Lane, England.

The Inland Sport plane which Moore used on the flight is a standard, two-place monoplane, manufactured by the Inland Aviation Company of Kansas City under Approved Type Certificate No. 259. The plane is produced with either the Warner Scarab or the LeBlond 60 engine.

Moore used on his flight for the light airplane speed record the same plane in which he established an American altitude record of 18,543 feet on September 30, 1929.

### National Glider Week Observed

NATIONAL GLIDER WEEK was held from November 18 to 23 inclusive under the auspices of the National Glider Association

of Detroit, in commemoration of the first anniversary of the association. Glider clubs in the following cities participated in glider events held throughout the country in conjunction with National Glider Week: Dayton, Ohio; Louisville, Ky.; Grand Rapids, Mich.; Kansas City, Kan.; Phoenix, Ariz.; and Jackson, Mich.

An all-Ohio glider meet was sponsored at Waynesburg on November 17 and glider groups in Akron, Columbus and Cincinnati participated in the program. A two-day glider carnival was scheduled in Detroit on November 23 and 24, at the Ford and Municipal airports.

## A.R.B.A. AND A.C.C. MEET IN WASHINGTON, D. C.

[J. F. BRADY]

WASHINGTON, D. C., was the scene of a gathering of aviation leaders, members of the American Road Builders Association and Government officials interested in the aeronautic industry on October 24th and 25th. It was the occasion of the first conference of the American Road Builders Association and the Aeronautical Chamber of Commerce of America. The group was brought together for the purpose of discussing the many complex problems which are coming up in the establishment, construction and maintenance of commercial, private and municipal airports, the control of flying at airports and the transportation of aerial passengers and freight between the airport and destination.

The meetings were held at the Willard Hotel, comprising three business sessions, two luncheons and a conference banquet. Papers were presented as follows: "Airport Layout and Planning," by B. Russell Shaw; "Airport Structures," by Kenneth Franzheim, architect; "Airport Drainage," by C. A. Hogentogler; "Airport Surfaces," by C. N. Conner; "Airport Management," by A. P. Taliaferro; "Airport Progress," by N. E. Duffy; "Airports and Public Parks," by Lt. Col. U. S. Grant, 3rd; and "European Practices," by Col. C. M. Young.

A general discussion was held after the reading of each paper and mutually beneficial information was exchanged. The conference was attended by about three hundred.

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AERONAUTIC EXPORTS DOUBLE

ALL previous export records of U. S. aeronautic manufacturers of aircraft, engines and parts were exceeded during the first nine months of 1929, according to records compiled by the Department of Commerce. Aeronautical exports during this period were almost double the shipments made to foreign countries during the entire year of 1928, the nine months' shipments being equal to 194 per cent of last year's total. Aircraft exports during this period were two and one-half times as great as during all of 1928, while engine exports were almost double. The shipment abroad of aeronautic parts showed a growth of more than 35 per cent, indicating the extent to which American aircraft are in use in foreign countries.

The figures for the export of aircraft, engines and parts for the nine-month period, as compared to those for 1928, are:

	1928	9 Months 1929
Aircraft .....	\$1,759,653	\$4,397,311
Engines .....	664,926	1,127,090
Parts .....	1,240,244	1,606,515
Total .....	\$3,664,823	\$7,130,916

During the first nine months of 1929 there were 275 aircraft exported with a total valuation of \$4,397,311, as compared with 162, valued at \$1,759,653, for the whole of 1928. From January to September, inclusive, of this year there were 265 aircraft engines exported with a valuation of \$1,127,090, as compared with a total foreign shipment of 179 aircraft engines with a valuation of \$664,826 in 1928. Shipments of airplane and aircraft engine parts so far this year reached a total valuation of \$1,606,515; foreign shipments of airplane and aircraft engine parts totaled \$1,240,244 for 1928.

Monthly exports of aircraft for the first nine months of 1929 averaged thirty, with a valuation of \$488,590. In 1928 the average monthly exports of aircraft was 13, with an average monthly valuation of \$146,637.

United States Exports of Airplanes

Country of destination	Full year, 1928		First 9 months, 1929	
	Number	Value	Number	Value
Mexico .....	20	\$190,133	79	\$1,492,501
Chile .....	40	721,750	64	631,172
Canada .....	62	685,712	5	35,002
Argentina .....	5	89,000	15	252,207
Japan .....	3	66,340	3	169,437
Ecuador .....	5	102,175	4	145,200
Brazil .....	9	199,810	8	113,086
China .....	24	34,500	6	106,852
Peru .....	1	23,844	6	105,853
Panama .....	11	84,950	11	104,600
Hong Kong .....	2	22,263	4	86,569
Italy .....	3	19,250	2	68,600
United Kingdom .....	2	54,887	3	60,000
Colombia .....	2	9,000	3	43,217
Philippine Islands .....	1	36,400	2	21,800
Honduras .....	3	6,000	2	19,645
Guatemala .....	1	50,872	4	10,000
Norway .....	1	6,000	2	8,053
French Oceania .....	7	50,872	1	7,000
Australia .....	7	50,872	1	3,600
New Zealand .....	1	6,000	1	2,181
Uruguay .....	1	5,500	1	1,800
Germany .....	1	4,183	1	1,800
Belgium .....	4	38,400	1	1,800
Switzerland .....	2	4,532	1	1,800
Bermudas .....	1	2,850	1	1,800
Total .....	162	1,759,653	275	4,397,311

Foreign shipments of aircraft engines averaged 29 per month from January to September, inclusive, of this year, and during the entire twelve months of 1928 they averaged 15. The average monthly valuation of these was \$125,232 in 1929, and \$55,402 in 1928. The monthly exports of aircraft and engine parts averaged \$180,724 during the first nine months of this year, as compared with an average valuation per month of \$103,353 for 1928.

For the month of August, 1929, there was a total of 24 aircraft exported with a valuation of \$375,933; engine exports totaled 9 at a valuation of \$36,090; and parts exported totaled \$191,044 in value. Canada ordered six planes, the largest number of aircraft exported to any single country during this month, with a valuation of \$58,188; and the largest number of engines exported also went to Canada to which 3

were shipped, having a total value of \$11,006. Canada also imported aircraft and aircraft engine parts with a total valuation of \$100,633, heading the list of countries which imported parts during the month of August. Soviet Russia was second with shipments of aircraft and engine parts totaling \$21,483.

There was a total of 30 aircraft exported during September with a valuation of \$388,307; 28 aircraft engines were exported, having a valuation of \$97,637; and the total valuation of aircraft and aircraft engine parts exported during this month was \$151,227. For the month of September the largest number of aircraft exported to any one country—9—went to Mexico at a total valuation of \$92,927; Canada was second with 6 aircraft, valued at \$37,400. Eight aircraft engines were shipped to Panama in September at a valuation of \$28,118. Canada imported parts totaling \$59,379 in value and headed the list of countries importing American parts during September.

TRENDS IN U. S. AERO-EXPORTS

By LEIGHTON W. ROGERS  
Chief, Aeronautics Trade Division

THAT United States airplanes are becoming increasingly popular in a greater number of foreign countries is indicated by the fact that during the first nine months of this year, 23 countries purchased our aircraft, of which 12 were in Latin America. It is significant that 59 per cent of all the exports of complete aircraft went to Cuba, Central America, and South America.

The unprecedented increase in exports of

U. S. Aeronautic Parts Exported

Country of destination	Full year, 1928	First 9 months, 1929
Canada .....	\$540,215	688,930
Soviet Russia in Europe .....	155,313	159,668
Peru .....	15,893	107,085
Mexico .....	21,162	90,924
China .....	86,888	82,573
Germany .....	70,548	73,503
United Kingdom .....	58,166	47,786
Japan .....	31,797	47,290
Cuba .....	24,184	34,835
Chile .....	17,443	34,232
Argentina .....	15,499	30,925
Panama .....	22,705	27,323
Netherlands .....	20,483	20,946
Colombia .....	10,482	20,422
France .....	1,303	19,904
Philippine Islands .....	53,630	19,893
Poland and Danzig .....	4,575	16,650
Belgium .....	2,741	13,262
Australia .....	6,546	11,483
Italy .....	40,686	9,649
Hong Kong .....	2,182	5,500
Bermuda .....	4,575	4,050
Finland .....	990	2,865
Nicaragua .....	2,742	2,742
Siam .....	1,101	2,034
Salvador .....	1,913	1,913
Norway .....	1,925	1,363
New Zealand .....	3,890	806
French Oceania .....	2,253	712
Honduras .....	4,455	4,455
Virgin Islands .....	4,455	4,455
Sweden .....	3,250	3,250
British West Indies .....	3,250	3,250
Trinidad .....	3,250	3,250
Java and Mandara .....	3,250	3,250
Dominican Republic .....	3,250	3,250
lie .....	3,250	3,250
Venezuela .....	3,250	3,250
Haiti .....	3,250	3,250
Spain .....	15,940	15,940
Switzerland .....	950	950
Guatemala .....	1,517	1,517
Other countries .....	732	4,569
Total .....	1,240,244	1,606,515

aeronautic products dating from the first of the present year may be attributed in part to the extension of United States airlines into Latin America and the West Indies. Undoubtedly, these lines will expedite international trade in those sections. Mail dispatched by steamer from Buenos Aires to New York would ordinarily be in route for 17 days. The schedule planned for the air routes, which will soon operate between the two points, is seven days. With night flying, which will be a natural development, the air mail time can be reduced by one-half. This is only one example of the appreciable saving of time. More than 20 countries in the Western Hemisphere are now connected by air mail services and,

(Continued on next page)

United States Exports of Aircraft Engines

Country of destination	Full year, 1928		First 9 months, 1929	
	Number	Value	Number	Value
Germany .....	23	\$132,510	48	\$315,576
Panama .....	1	150	25	129,784
Poland and Danzig .....	1	3,574	35	121,015
Mexico .....	10	24,773	36	102,730
Canada .....	43	177,946	21	90,641
Japan .....	10	41,281	24	75,098
Peru .....	2	8,002	7	43,242
France .....	3	6,223	9	30,061
Argentina .....	7	23,315	11	26,470
Philippine Islands .....	2	26,320	2	26,320
Chile .....	5	24,715	5	24,715
Colombia .....	3	20,021	3	20,021
Soviet Russia in Europe .....	2	19,643	2	19,643
Switzerland .....	1	19,375	1	19,375
China .....	5	38,900	6	18,000
United Kingdom .....	29	75,780	3	12,100
Belgium .....	1	10,000	1	12,000
Netherlands .....	14	62,712	5	11,500
Italy .....	4	8,338	3	5,660
Cuba .....	3	250	1	4,827
Nicaragua .....	3	1,400	1	4,000
Dutch Guiana .....	1	4,000	3	2,350
Guatemala .....	1	19,911	1	1,810
Sweden .....	2	1,525	1	1,529
Australia .....	8	6,200	1	1,449
Honduras .....	1	1,030	1	913
Salvador .....	1	706	1	200
Trinidad .....	1	1,160	1	116
Norway .....	1	19,345	1	116
French Oceania .....	1	3,111	1	116
New Zealand .....	1	960	1	116
Denmark .....	1	960	1	116
Spain .....	1	960	1	116
Hong Kong .....	4	960	1	116
Total .....	179	664,926	265	1,127,090



(Continued from preceding page)

from all indications, practically all of them will have this service within the next few years.

The passenger and express phase of these recent international airline developments are of importance to business with the countries to the south. Executives who have not been able to take the time to travel by steamer to call on overseas customers will be able to transact important business personally and this will all have a bearing on our future trade.

Canada, which was the leading market in 1928, was led by Mexico and Chile in the valuation of complete airplanes purchased during the first nine months. This may be explained in part by the increased activity in assembling United States aircraft in Canadian factories.

Demonstrations have played an important part in the sales of our aircraft, and those to Chile and Mexico may be attributed largely to the fact that American pilots and planes have penetrated into those sections. From all indications, there will be additional demonstration missions in Latin America within a short time; their effectiveness is conclusive.

China, which was only recently opened as a market, purchased 19 airplanes during the first three-quarters of the year, as compared with nine for the whole of 1928. Eleven of these went through Hong Kong for re-exportation. These planes are used on airlines and for training purposes.

Canada was replaced by Germany as the principal market for aircraft engines, the latter country taking 48 engines valued at \$315,576. These engines are used on German-made aircraft, and will soon be manufactured under a licensing arrangement for sale not only in Germany but in the rest of Europe. The average unit valuation of aircraft engine exports is increasing, indicating that stocks of war surplus engines are no longer available in the United States for export. Argentina, Japan and Peru were among the more important purchasers of engines for use in not only military aircraft but to power commercial equipment.

Of the 265 engines at a valuation of \$1,127,090 exported during the first three-quarters of the current year, it is estimated that about 40 per cent was for use in aircraft of European manufacture. Another 40 per cent was probably for replacement purposes, and the remainder for installation in American planes shipped separately.

The engine manufacturers of the country are making it a point to keep track of shipments of aircraft equipped with their respective engines, in order to take care adequately of servicing. Some of the parts exported, therefore, are engine parts. During the whole of 1928 only 179 aircraft engines valued at \$664,926 were exported. The increase which occurred this year over last indicates that the superiority of certain United States power plants is being recognized overseas. It is thought in this connection that the new development in chemical cooling of the water-cooled types will increase the exports of this item, inasmuch as many foreign airplanes are not designed for the

installation of radial air-cooled types.

Forty-three countries purchased parts during the first nine months of the year. These miscellaneous items of aeronautic equipment went to 20 more countries than did complete aircraft—which may mean that in those countries parts shipments will pioneer the way for sales of the complete units.

It is gratifying that all of the countries purchasing aircraft are stocking spare parts in order to maintain operation of the equipment. Soviet Russia in Europe, it is noted, is the second market of importance, while Canada, with about 90 per cent of its aviation equipment of American origin, is the most important market. Peru, the third market of importance, increased its takings during the first nine months of the year approximately one hundred fold over those for the full year 1928, while China purchased over \$82,000 worth of spares and accessories.

Even Germany, the United Kingdom, the Netherlands, Belgium, and Italy purchased appreciable quantities of aeronautic equipment. France, with its highly developed aeronautic industry, was the country of destination for parts valued at nearly \$20,000, as compared with but \$1,300 last year. These shipments attest to the fact that American air transport routes are furnishing a comparatively large domestic market, and that it pays overseas operators to use the instruments and other technical items which have been in successful use in this country.

Australia, which at present, is a closed market for complete aircraft from the United States, purchased parts amounting to \$13,262, as compared with but \$2,741 in 1928. This condition may be because of the special items of equipment developed in the United States, which are not available elsewhere. There are specific types of airplanes, seaplanes and amphibians made in the United States which have little or no competition.

#### Nicholas-Beazley Export Shipments

THE Export Division of the Nicholas-Beazley Airplane Co., Inc., of Marshall, Mo., made more than thirty-five shipments to foreign countries during the past month, including shipments to Bangkok, Siam; Bloemfontein, South Africa; Sao Paulo, Brazil; Honolulu; Buenos Aires; Honduras; Germany and Alaska. The development of aviation in foreign countries, which has heretofore been confined mostly to government activities, is now beginning to receive the attention of a number of the large foreign concerns, according to W. F. Potter, Export Manager of the Nicholas-Beazley Company. The main problem facing American manufacturers in securing the foreign trade are the artificial trade barriers imposed by European interests, Mr. Potter pointed out.

THE National Glider Association will hold a banquet at the Ritz Carlton Hotel, New York City, on December 5. William P. MacCracken, Jr., has been named chair-

man of the banquet which will be held for the purpose of discussing gliders in relation to the aircraft market. Edward S. Evans, honorary president and founder of the National Glider Association, will attend the banquet and present a detailed plan and budget which will propose the establishment of a traveling institute of gliding and soaring to stimulate the use of the same equipment and personnel in different sections of the country for training glider pilots.

#### Curtiss-Wright Sales Corporation Officials Announced

WALTER H. BEECH, president of the Curtiss Wright Sales Corporation, a division of the Curtiss-Wright Corporation formed to handle the airplane sales of the several units comprising the parent company, recently announced the names of the officers and directors of the new corporation.

The officers are as follows: Walter H. Beech, president; J. A. B. Smith, vice president; Edgar N. Gott, vice president; William B. Robertson, vice president; C. W. Loos, treasurer; and George L. Mentley, secretary. The directors include the following: C. M. Keys, chairman; Richard F. Hoyt, J. A. B. Smith, Walter H. Beech, C. W. Cuthell and C. S. Jones.

Headquarters have been established in the Curtiss-Wright building, 27 West 57th Street, New York City, and all distribution will be controlled from this point. Mr. Beech has appointed George L. Mentley, formerly of Curtiss Flying Service, assistant sales manager, and Stanley W. Jacques, formerly of Keystone Loening, as advertising and sales promotion manager.

Regional sales managers who will divide territories in the United States are: O. G. Harned, Northeastern division. Doug. Davis, Southeastern division; J. R. O'Connell, Middlewest division; E. K. Campbell, Central Northwest division; and E. B. Christopher, Western division.

#### German Flier Completes World Tour With Light Plane

BARON FRIEDRICH WARTHAUSEN, German flier, arrived at Roosevelt Field, L. I., on November 3, completing, except for the Pacific Ocean and two short hops in Asia, an 18,000-mile flight from Berlin to New York. He was met by representatives of the Aeromarine-Klemm Corporation of Keyport, N. J., builders of the American model of the Klemm-Daimler, open-cockpit monoplane which he used on his flight.

Warthausen left Berlin on a flight originally scheduled to Moscow for the Hindenberg cup for the longest light plane flight. Then, hoping to establish a distance record for light planes and retain permanent possession of the Hindenberg cup, Warthausen continued his flight, eventually reaching India by way of Arabia, making stops en route. He continued his flight from India to China by way of Siam and China. At Yokohama he crated his plane and took a boat to San Francisco. When his ship was overhauled at San Francisco, Warthausen flew to Los Angeles. He then flew to El Paso, Texas, and



proceeded to New York, making stops en route at Sweetwater, Kansas City, Chicago, Buffalo, Rochester, Little Falls and Albany.

Warthausen crated his plane at New York and sailed for Germany on November 6.

**WILLIS G. BROWN** has been appointed vice president in charge of sales of the Warner Aircraft Corporation of Detroit. Mr. Brown was formerly president of the Spartan Airplane Company of Tulsa, Okla.

#### Mississippi River Flood Area Photographed by Curtiss-Wright Flying Service

**A**N aerial photographic survey covering 8,481 square miles in the Mississippi River region has been completed by the Aerial Survey Division of the Curtiss-Wright Flying Service. The contract for the survey was awarded the Curtiss-Wright company by the Government in connection with the Mississippi River Flood Control Program.

The survey was made over the region which stretches along the course of the Mississippi River, and covered parts of Missouri, Arkansas, Kentucky, Tennessee and Mississippi. The work was completed in three months. Five planes were used in the survey and a total of 412 hours was flown. The photographs were taken from an altitude of 12,400 feet and 11,419 negatives were taken. From these exposures, 45,676 prints were made and 33,257 were delivered to the Government. Thirty-five index maps for locating the individual photographs from which to make the line maps were also made.

The Government allowed a maximum error of one per cent for each photograph made by the Survey Division. In spite of the use of altimeters to control the elevation of the planes within a limit of ten feet, it was necessary to enlarge or reduce to a common scale each of the 33,257 photographs.

#### TWENTY U. S. FLYING SCHOOLS APPROVED

**TWENTY** flying schools throughout the United States, giving flight and ground school instruction, have received certificates of approval from the Department of Commerce. The schools received Approved School Certificates following examinations by inspectors of the Federal department, who inspected the organization of the school in general, methods of instruction, training equipment including the field, hangars, shop facilities and planes, and ground school.

A list of the first sixteen flying schools to receive Approved School Certificates from the Department of Commerce appeared in the November issue of *AERO DIGEST*. The four additional schools recently approved are:

Boeing School of Aeronautics, Oakland Municipal Airport, Oakland, Calif.

Spartan School of Aeronautics, Municipal Airport, Tulsa, Oklahoma.

Curtiss Flying Service, Los Angeles Municipal Airport, Inglewood, Calif.

Roosevelt Aviation School, Roosevelt Field, Unit No. 1, Mineola, Long Island, New York.



**Willis G. Brown**, newly elected vice president of the Warner Aircraft Corporation.

#### SCHEDULE OF COMING AERONAUTIC EVENTS

December 4-5. Dedication of Roswell, New Mexico, Airport.

December 9-14. First Annual Baltimore Aircraft Show, Fifth Regiment Armory, Baltimore, Md.

December 10-16. First Mexican Airshow, Mexico City, Mexico.

December 16. Regional airport conference of New England, Bridgeport, Conn.

January 13, 14, 15. Miami All-American Air Meet, Miami, Florida.

January 13. Aeronautical Meeting of the Society of Automotive Engineers, Miami, Fla.

January 21. Aeronautical Meeting of the Society of Automotive Engineers, Detroit, Mich.—Aeronautical session at annual meeting of S. A. E.

February 7-15. Second Annual New York Aviation Show, Aviators Post No. 743, American Legion, New York City, N. Y.

February 8-15. First Cincinnati Aviation Show, Music Hall, Cincinnati, Ohio.

February 15-23. International Class-A Aircraft Show, St. Louis, Mo.

March 6-15. Second Annual Pittsburgh Aircraft Show, Pittsburgh, Pa.

April 5-13. Third All-American Aircraft Show, Detroit Board of Commerce, Detroit, Mich.

April 8-9. Two-day meeting of S. A. E. during Detroit Aircraft Show.

May 3-10. New York Aircraft Show, Aeronautical Chamber of Commerce, Madison Square Garden, New York City, N. Y.

September 1-6. Fifth International Air Congress, The Hague, Holland.

#### Airways Division Headquarters Established at Fort Worth

**H**EADQUARTERS of the Airways Division, United States Department of Commerce, were recently established at Fort Worth, Texas, for the purpose of supervising all Government civic aeronautical activities, with the exception of the licensing of planes and pilots, for the Southwestern district. The territory which will be supervised from the Fort Worth headquarters is bounded by the Mississippi River on the east, the California state line on the west, Kansas City on the north, and the Mexican Border on the south.

The Airways Division at Fort Worth will eventually employ about 150 men, which will include the headquarters staff in Fort Worth, mechanics and others who will be stationed at points along the Federal airways in the Southwestern district.

Proper marking and lighting of fields and the establishment of intermediate landing fields and beacon lights will be carried on in the Southwestern district under the supervision of the Fort Worth office of the Airways Division. The beacon lights will be located every ten miles and intermediate landing fields every thirty miles. The intermediate landing fields will be equipped with beacon and boundary lights, with all obstructions marked with red lights. Day markers, including a large white circle in the center of the field and yellow cones placed at 300-foot intervals around the field, will be installed.

The radio work, which will be supervised by the Airways Division at Fort Worth, includes point to point radio or telegraph service, ground to plane radio telephone service, a weather service featuring the hourly broadcast of conditions, and the radio range beacon which keeps a plane on a straight line of flight by flashing a code warning when the ship varies either to the left or right of its course.

The work of the Airways Division will also include work in connection with the maintenance of fields and the operation of beacons. An Airways Division mechanic will be assigned to every 175 miles of airways. A caretaker for every intermediate field works under the mechanic assigned to that territory. Routine trips in a maintenance truck will be made over the territory regularly.

George Carter Miller has been appointed airways engineer in charge of the Fort Worth headquarters. He began his career in aviation as a Navy flier in 1917. After leaving the service, he became affiliated with the Department of Commerce. Mr. Miller will be assisted by M. M. North who will be in charge of mechanics and maintenance details. Mr. North is a former member of the Army Air Corps. H. E. Curry, formerly of the Navy Department, has been appointed disbursing officer in charge of the office personnel.

Federal airways under the supervision of the Airways Division are: the line from Gallup, New Mexico, to Clovis, operated by Transcontinental Air Transport and Western

(Continued on next page)



(Continued from preceding page)

Air Express; the line from Waynoka, Okla., to Wichita, Kan., operated by the same companies; the Fort Worth to Kansas City leg of the National Air Transport route to Chicago; the Ponca City to Tulsa line of N. A. T.; and the Fort Worth to Waco and Fort Worth to Brownsville lines of Texas Air Transport, Inc.

A NEW record of 785 miles in four and one-half hours on the New York to Atlanta flight was established on November 4 by Doug Davis of the Southwestern division of the Curtiss-Wright Sales Corporation. Flying the Travel Air Mystery Ship Davis maintained an average speed of 175 miles per hour on the flight. He stopped for gas twice on the trip, at Richmond, Va., and Spartanburg, S. C. The former record for the New York-Atlanta flight was seven hours.

Davis flew at an altitude of 2,000 feet most of the way but dropped down to an altitude of 750 feet after leaving Spartanburg when a heavy rain storm was encountered.

### Sky High

By Eric Hodgins and F. Alexander Magoun

BEGINNING with the dawn of aviation when man first compiled theories on flight, "Sky High," by Eric Hodgins and F. Alexander Magoun, traces the development of flying from the first attempts with crude lighter-than-aircraft to the present day. Historical data has been compiled on the first hot air balloons, the first aerial navigators and passengers, the early attempts to fly in heavier-than-air craft with flapping wings, and the first gliders. Comparatively recent experiments of the Wright brothers and others with aircraft, including rigid airships, are also covered. The authors divide attention between an exposition of the problems overcome by man and a narration of his actual flights.

### Applied Aerial Photography

By Capt. Ashley C. McKinley

CAPT. MCKINLEY'S book "Applied Aerial Photography" is written to make available in one volume a compact study of modern aerial photography. The official aerial surveyor of the Byrd Antarctic Expedition has presented in this book a practical working knowledge of modern aerial cameras, photographic emulsions, and photographic processes.

Since the Great War remarkable progress has taken place in the science of aerial photography. Methods and apparatus have been refined and developed to an extraordinary degree. What was once an expedient and rapid method of obtaining clear pictures of enemy country has now become a scientific means of accurate topographic mapping. Engineers, foresters, geologists, and others have found this comparatively new science of incalculable value as a surveying method of precision.

In view of the rapid development of aerial photography since the war most literature on this subject has become obsolete. An exception to this is the work produced by the United States Army Air Corps, an invaluable source of material from which the author has obtained most of his data. The volume discusses the problems of taking aerial haze, the methods of finishing photographs, the use of photographs for mapping, and oblique aerial surveys.

### This Aviation Business

By Ernest W. Dickman

THE purpose of "This Aviation Business" is explained by the author in the foreword in which he states that the volume is "an attempt to dispell the fog of mystery, ignorance, misdirected enthusiasm and just plain lying which surround our latest industrial infant." Mr. Dickman's book is a verbal vertical photograph of the industry. He summarizes the past, analyzes present conditions and prophesies the future. In eleven chapters the author encompasses such phases of aviation as commercial development, notable flights, safety in flight, aviation as a career and the financial situation in aeronautics.

### Knights of the Air

By Lieut. Lester J. Maitland

LIEUT. MAITLAND'S book, "Knights of the Air," is a history of famous flights and fliers which, rather than giving a complete history of aeronautics, is primarily a history of the outstanding personalities of earlier aviation. The book is written in narrative style and covers the first twenty-five years in the history of aviation from the pioneering experiments with heavier-than-air-craft, to the use of planes in the World War and the transatlantic flights. There is little technical exposition, but the author conveys an idea of the tremendous problems overcome when man attempted to fly and when he flew.

Lieut. Maitland has faithfully reported his story with an intimate and personal touch.

## N.A.C.A. REPORTS

### N.A.C.A. Report on Wind Tunnel Tests of Wing Models Through Large Angle of Attack Range

REPORT No. 317 of the National Advisory Committee for Aeronautics entitled "Wind Tunnel Tests on a series of Wing Models Through a Large Angle of Attack Range" by Montgomery Knight and Carl J. Wenzinger, covers force tests through a large range of angle of attack on a series of monoplane and biplane wing models. The tests were conducted in the atmospheric wind tunnel of the National Advisory Committee. The models were arranged in such a manner as to make possible a determination of the effects of variations in tip shape, aspect ratio, flap setting, stagger, gap, decalage, sweepback, and airfoil profile. The arrangements represented most of the types of wing systems in use on modern airplanes.

The effect of each variable is illustrated by means of groups of curves. A correction for blocking in this tunnel which applies to monoplane at large angles of attack has been developed, and is given in the appendix.

### N.A.C.A. Report No. 320 on Hot-Wire Anemometer Measurements of Air Speed Fluctuations

REPORT No. 320 of the National Advisory Committee for Aeronautics entitled, "The Measurement of Fluctuations of Air Speed by the Hot-Wire Anemometer," describes the hot-wire anemometer method of measuring the fluctuating air velocities found in turbulent air flow. Explaining that the only obstacle in the use of this method is the presence of a lag due to the limited energy input which makes even a small wire incapable of following rapid fluctuations accurately, the paper describes an experimental arrangement for compensating for the lag. This arrangement, however, only compensates for the lag for frequencies up to 100 or more per second when the amplitude of the fluctuation is not too great.

### Civil Service Examination for Junior Aeronautical and Mechanical Engineers

OPEN competitive examinations for junior aeronautical engineer, and junior mechanical engineer, have been announced by the United States Civil Service Commission. Applications for the examination must be on file with the Civil Service Commission not later than February 4, 1930.

The duties of junior aeronautical engineers and junior mechanical engineers are to perform routine testing, inspection of engineering material, drawing up plans for minor projects, preparing specifications for engineering material or apparatus, performing field work, making computations, preparing maps, assisting in the conduct of experimental research, compiling reports and handling technical correspondence. The entrance salary for junior aeronautical or mechanical engineers is \$2,000 a year.



Travel Air "Mystery Ship" in which Doug Davis recently flew 785 miles at an average speed of 175 miles per hour



# TOUR OF THE GENERAL "SKY FLEET"

By W. O'NEIL

President,  
General Tire and Rubber Co.

**S**MALL cabin monoplanes can travel, in fleet formation, day after day for extended periods throughout the United States and can do so safely, economically and comfortably. That has been demonstrated by the five months' tour of the "Sky Fleet" of the General Tire and Rubber Company, which has just been completed.

When this fleet of seven cabin monoplanes finished its cruise over thirty-two states, from one end of the nation to the other, it had flown more than 20,000 miles under all kinds of flying conditions. Started as a project to aid in the development of commercial aviation by the use of rubber appliances on airplanes and by demonstrating the practicability of the small cabin monoplanes for continuous, day-after-day use in the cross-country travel on business or pleasure trips, the tour of the "Sky Fleet" developed into a super-test trip. During landings made on all kinds of airports, and under all sorts of weather conditions, tests and observations were made by aeronautic engineers attached to the "Sky Fleet" with a view to determining how this might best be accomplished. General Tire and Rubber Company engineers are now working on the results of these tests and observations.

The "Sky Fleet" originated in the mind of the manager of the aeronautical department of the General Tire Company, Alger G. Maranville, who is widely known for his inventive contributions to aircraft and who will soon have more important developments to announce.

The young Air Corps lieutenants from the First Pursuit Group who made up the personnel of the "Sky Fleet" were Lieut. Arthur C. Lybarger, fleet commander; Lieut. J. Stanley B. Harvey, finance officer;

Lieut. Robert K. Giovannoli, fleet engineer; Lieut. Sheldon B. Yoder, fleet technician; Lieut. Horace J. Reid, meteorologist; Lieut. Murl Estes, Lieut. Alfred Kalberer; and Lieut. Robert K. Black. Lieut. Black piloted the manufacturer's ship in the fleet. Eric E. Seward, motor expert with the Warner Aircraft Corporation, of Detroit, accompanied the fleet to take care of the Warner Scarab 110-horsepower engines with which the planes were equipped. Frank Hoffman and V. G. Scochera, airplane engineers, acted as mechanics on the tour. Earl M. Harvey, of the General Tire and Rubber Company, managed the "Sky Fleet" tour and accompanied the fleet most of the time. Harold S. Hoover, news director of the General Tire and Rubber Company, flew with the fleet part of the time and directed part of the tour. C. H. Townsley, of the advertising department of the General Tire and Rubber Company, traveled ahead of the fleet part of the time, making advance arrangements.

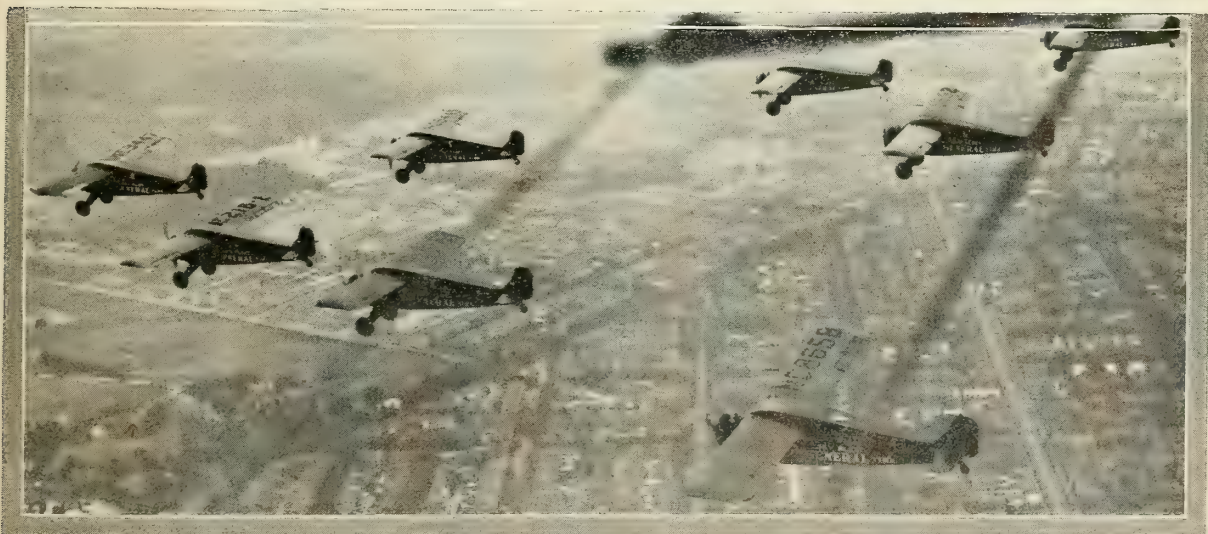
Appropriately, the tour was started under Army auspices. In June, after the pilots had obtained their releases from active duty at Selfridge Field, they flew the eight cabin monoplanes in the "Sky Fleet" to Washington, D. C., where the fleet was formally dedicated under the auspices of Major General James E. Fechet, Chief of the Army Air Corps, and the flagship was christened by his daughter, Miss Mary Fechet, as the *General Jim* in honor of her father.

Through the east central states, the "Sky Fleet" toured first, gliding down into city after city in the Ohio and Mississippi river basins. Wherever special aeronautic activities were being held, the "Sky Fleet" tried to participate and aid the projects by its participation.

Then, through New York and the New England states as far as Portland, Me., doubling back to fly down the Atlantic Coast, they stopped at all principal cities as far south as Washington. Heading westward, the fleet again crossed the mountains and flew through Michigan and the north-central area, then down through the Southwest and the Middle Western states beyond the Mississippi. East from Texas, the "Sky Fleet" skirted the Gulf of Mexico down the west coast of Florida. Returning north through the Southeast, it completed more than 20,000 miles of travel in a little more than five months.

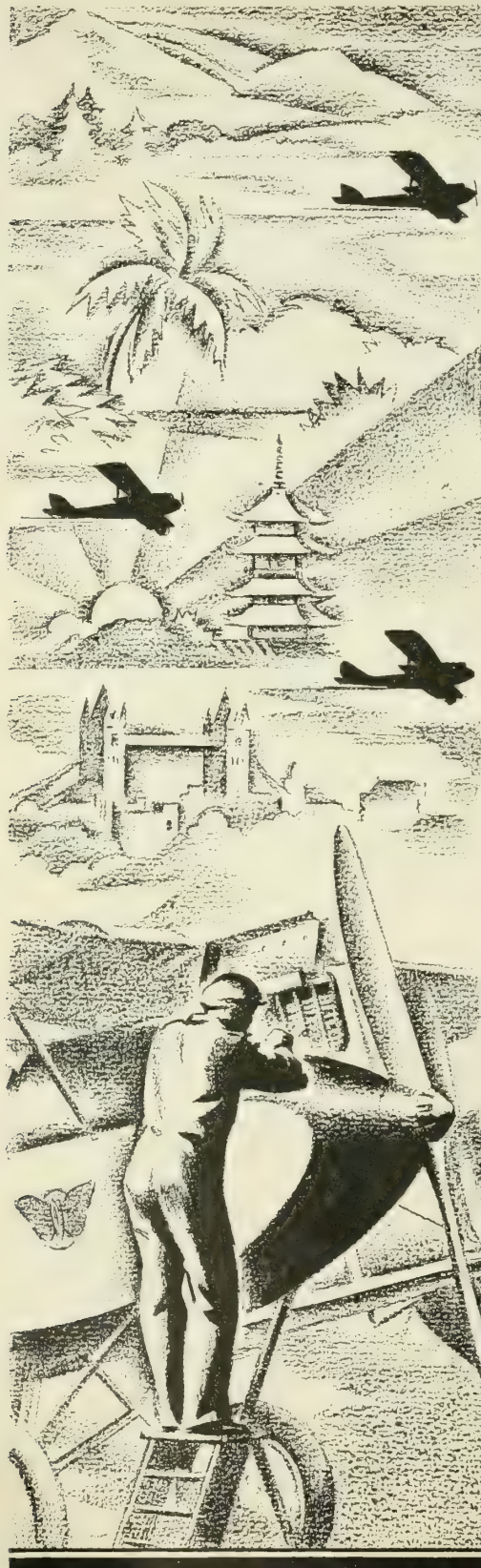
The cost of gasoline for the seven planes amounted to about \$10 per hour for the fleet or about \$1.40 per hour for each plane. Oil for the fleet cost about \$1.50 per hour or about 20 cents an hour for each ship. Hangar rental amounted to \$592 or \$84.58 for each ship. If there had been only one or two ships in the operation, the proportionate cost of hangar space probably would have been greater, for, at many airports, there was hangar space for only one or two of the ships, so none of them was put into the hangar at those places. Expense of making repairs to the ships en route, including all minor crack-ups and the wages of one mechanic who accompanied the fleet amounted to \$17.20 per hour for the fleet,

(Continued on page 206)



The "Sky Fleet" of the General Tire and Rubber Company, consisting of eight Aristocrat cabin monoplanes, flying in military formation over Washington, D. C., during its tour of the East, Middle West and Southwest





# MOTH

## *Service Stations Cover the World*

WITH a Moth, the whole world is your care-free playground! You can fly from coast to coast—summer in Canada, winter in the south—you can even fold your trusty Moth's wings, pack it on a steamer, and sail for colorful lands abroad, where new flying thrills await you. And wherever you fly your Moth, you will always have the assurance that comes from being within easy reach of a station where your plane and engine can be expertly serviced. On the opposite page, we give a list of such stations. No other plane can offer such complete service facilities. A Moth owner buys—a Moth dealer sells—not only a plane of exceptional performance, but also unlimited flying possibilities!

*We are glad to announce that due to greatly increased production, we are able to make immediate deliveries of Gipsy Moth planes.*



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- Houston, Texas
- Indianapolis, Ind.
- Oklahoma City, Okla.
- Louisville, Ky.
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### **Distributors and Flying Clubs in Canada and the Provinces**

- Toronto, Ont.
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- St. John, N. B.
- Moncton, N. B.
- Granby, Que.
- Kingston, Ont.
- Ottawa, Ont.
- Hamilton, Ont.
- St. Catharines, Ont.
- London, Ont.

- Skyways, Inc., Boston, Mass.
- Skyways, Inc., West Barnstable, Mass.
- Skyways, Inc., Portland, Me.
- Albany Air Service, Albany, N. Y.
- Harris & Brown, Wellsville, N. Y.
- Mobodo Aircraft Corporation, Plattsburgh, N. Y.
- Utica Flying Service, Utica, N. Y.
- Air Service, Inc., Johnstown, Pa.
- Lancaster Airways, Lancaster, Pa.
- Thompson Aeronautical Corp., Cleveland, O.
- Thompson Aeronautical Corp., Detroit, Mich.
- Thompson Aeronautical Corp., Kalamazoo, Mich.
- Dixie Flying Service, Charlottesville, Va.
- H. S. Jones, Fort Worth, Texas
- Crook Company, Los Angeles, Cal.
- Phil Davis, Oakland, Cal.

- Walkerville, Ont.
- Fort William, Ont.
- Regina, Sask.
- Moose Jaw, Sask.
- Saskatoon, Sask.
- Edmonton, Alta.

### **Wright Aeronautical Corporation Parts Distributors**

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- Dearborn, Mich.
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- Atlanta, Ga.
- Fort Worth, Texas
- Mexico City

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- Concord, N. H.
- New York, N. Y.
- Albany, N. Y.
- Syracuse, N. Y.
- Buffalo, N. Y.
- Pittsburgh, Pa.
- Evansville, Ind.

- Indianapolis, Ind.
- Terre Haute, Ind.
- Dayton, O.
- Cincinnati, O.
- Grand Rapids, Mich.
- Jackson, Mich.
- Kalamazoo, Mich.
- Mt. Prospect, Ill.
- Milwaukee, Wis.
- Wausau, Wis.
- St. Louis, Mo.
- Marshall, Mo.
- Oakland, Cal.
- San Diego, Cal.
- Santa Maria, Cal.
- Van Nuys, Cal.
- Greensboro, N. C.
- Spartanburg, S. C.
- Nashville, Tenn.
- Chattanooga, Tenn.
- Richmond, Va.
- Macon, Ga.
- Birmingham, Ala.
- Mobile, Ala.
- Daytona, Fla.
- Miami, Fla.
- Tampa, Fla.
- Jacksonville, Fla.
- Tulsa, Okla.
- Oklahoma City, Okla.
- New Orleans, La.
- Monroe, La.
- Shreveport, La.
- Dallas, Texas
- Houston, Texas
- Brownsville, Texas
- El Paso, Texas
- San Antonio, Texas
- Amarillo, Texas
- Big Springs, Texas

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- Newcastle
- Birmingham
- Bristol
- Glasgow
- Hamble (Hampshire)
- Folkestone
- Northampton
- Leicester
- Norwich
- Hadleigh (Suffolk)
- Bournemouth
- Nottingham
- Heston (Middlesex)
- Hanworth (Middlesex)
- Brooklands (Surrey)
- Haldon (Devonshire)
- Cambridge (Bristol)
- Teignmouth

### **Distributors, Flying Clubs and Schools Abroad**

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- Brisbane, Australia
- Hay, W. Australia
- Perth, Australia
- Longreach, Australia
- Sidney, Australia
- Goulburn, New South Wales
- Auckland, New Zealand
- Karachi, India
- Delhi, India
- Bombay, India
- Calcutta, India
- Allahabad, India
- Johannesburg, South Africa
- Durban, South Africa
- East London, South Africa
- Port Elizabeth, South Africa
- Germiston, South Africa
- Mozambique, Portuguese East Africa
- Berlin, Germany
- Bologna, Italy
- Brussels, Belgium
- Oslo, Norway
- Stockholm, Sweden
- Madrid, Spain
- Kopenhagen, Denmark
- Basle, Switzerland
- Geneva, Switzerland
- Athens, Greece
- Constantinople, Turkey
- Tallinn, Estonia
- Zbaszyn, Poland
- Belgrade, Jugo-Slavia
- Singapore, Straits Settlements
- Malta
- Shanghai, China
- Mexico City, Mexico
- Valparaiso, Chile
- Santiago-de-Chile
- Lima, Peru

**MOTH AIRCRAFT CORPORATION, LOWELL, MASS.**





Above are the pilots, members of the First Pursuit Group of the Army Air Corps, Selfridge Field, Mich., who piloted the eight Aristocrat planes of the General Tire and Rubber Company on their 50,000-mile tour of the United States. They are (left to right): Lieuts. Black, Reid, Estes, Kalberer, Giovannoli, Harvey, Lybarger (fleet commander) and Yoder.

(Continued from preceding page)

which made an average expense of about \$2.50 per hour for each of the seven ships.

In estimating the amount of depreciation, it is regarded as fair to place it at 20 per cent of the cost of the ships. This is the average depreciation on planes in ordinary use for a year, but the severe service to which the planes were subjected during five months is believed equivalent to a year's ordinary use. This would make the depreciation expense for the fleet \$9,000 or \$1,285.75 for each ship.

Only passenger and public liability insurance was carried on the planes in the "Sky Fleet." No insurance against damage to the planes was carried, since it was found that one and one-half airplanes could have been lost completely for the price of the premium on the fleet; it was found cheaper therefore, not to carry crack-up, fire and theft or windstorm insurance. Cost for insurance was \$5,404 for the fleet or an average of \$772 for each of the seven ships.

The sum of these items makes a total of \$22,044.45 as the cost of the operation of the fleet for five months, exclusive of pilots' salaries, or a little more than a dollar a piece for each of the 20,000 and some odd miles flown. The total cost for each ship was \$3,169.39.

In the thirty-two states visited, the "Sky Fleet" pilots reported that they did not find airports, on the whole, up to their expectations. The best airports were found in the parts of the country where the terrain was naturally level and where landing fields needed little grading or filling-in. This included principally the Middle West and Southwest, as well as several of the east-central states.

"Cities in sections like New England and parts of the Atlantic Seaboard, where landing fields have to be chiseled out of the rocks or built up out of the marshes or ocean-bed," one member of the party pointed out, "deserve the most credit for airport development."

Bowman Field at Louisville, Ky., is one of the best all-round fields in the country, all of the pilots agreed. Port Columbus, the newly-built eastern air terminus of the T.A.T. air-rail system at Columbus, Ohio, is an excellent field, they said, but at the time the "Sky Fleet" was at Columbus, the field had not been improved so that landings could be made elsewhere than on the tarvia runways. For small cabin planes, the pilots

found the landing surface of these runways was rather hard.

Several of the pilots spoke of the excellence of the municipal airports at Buffalo, N. Y., and Cleveland, Ohio, as well as Winburn Field at San Antonio, Texas. Lunken Airport at Cincinnati, they said, is better than ordinary. The "Sky Fleet" pilots admired that airport at Hartford, Conn., and were interested in the provisions made there for anchoring seaplanes. Memphis, Tenn., also is planning to have a seaplane anchorage.

Love Field at Dallas, Texas, shared with Winburn Field at San Antonio the distinction of being the best fields in Texas in the opinion of the "Sky Fleet" pilots. Houston, Texas, also came in for a good word when the pilots were discussing airports on which they had landed. Several of the pilots insisted that Vandalia Airport at Dayton, Ohio, Fairfax Airport at Kansas City, and the municipal airport at Memphis, Tenn., were among the best of the scores on which the "Sky Fleet" made landings.

On the other hand, the pilots "dragged" and finally landed in many a field which is listed on the Department of Commerce maps as an approved airport but which was not fit for accommodating even the small, easily handled cabin monoplanes in the "Sky Fleet," much less the larger ships with higher cruising and landing speeds. New England they found to be sadly in need of airports, as well as the far South and the Southeast, from the eastern boundary of Texas to the Atlantic Seaboard and as far north as Ohio. The airport at one Florida city, listed by the Department of Commerce, was a decided disappointment to the "Sky Fleet" pilots. Much of the field was covered with water when the "Sky Fleet" landed there. In fact, as one of the fliers pointed out, "it could easily have been mistaken for a seaplane anchorage." When the members of the "Sky Fleet" party were frank in their criticism of this port, one of the local newspapers commented on this criticism in an editorial headed "Sad but True." A few days afterward, the citizens approved a bond issue to build a real airport.

Among the larger cities, they found that Detroit and Philadelphia were not as well equipped with municipal airports although there were excellent ports in or near both of these cities—Ford Airport at Detroit and the Camden, N. J., port just across the river from Philadelphia.

At many airports, where the landing fields themselves are fairly level, too little attention has been paid to removing dangerous obstructions immediately adjacent to the fields, several of the pilots pointed out. Lieut. Yoder pointed out that this was particularly true of a large Louisiana port and one in Pennsylvania. At both cities, it was necessary to take off directly over clumps of large trees at the very edge of the landing fields.

The pilots realized, however, that many of the fields were in poor condition because they were under construction at the time. A few months, or even a few weeks later, some of the worst fields on which they landed might have become some of the best. They did object, however, to having these fields listed on Department of Commerce airway bulletins as adequate airports while still under construction.

They contrasted the tactics followed in two Florida cities. At one, an excellent airport was in the making and nearly completed, but it was not to be listed as an airport until actually completed. At the other, on the other hand, the airport was on the maps although it was far from completed or ready for use.

Officials of the General Tire and Rubber Company have been informed that in at least three cities the visit of the "Sky Fleet" aided materially in obtaining the passage of municipal bond issues for airport funds. Among these was Thomasville, Ga., where the "Sky Fleet" had failed to land because of the unsatisfactory condition of the field which that city had termed an airport.

Everywhere the "Sky Fleet" went, it was warmly welcomed by the leading officials and citizens of cities, states and the nation. At Washington, D. C., President Hoover invited the pilots and fleet officials to call on him at the White House. He chatted with them, in the executive offices, for a quarter of an hour, and smilingly expressed the wish that he might be going along on the tour.

Governor Myers Y. Cooper of Ohio, Governor John N. Trumbull of Connecticut, many congressmen and mayors of scores of cities greeted the "Sky Fleet" party during the nation-wide tour.

One of the most interesting incidents of the tour was the visit of the "Sky Fleet" to the research laboratory of Orville Wright, "Father of Aviation," at Dayton. Mr. Wright chatted with the young fliers at length, relating interesting incidents about the early days of aviation. The "Sky Fleet"



pilots were particularly impressed by one remark that Mr. Wright made. He had told them how laboriously and cautiously they had to work to perfect some of the aeronautic developments that are regarded as matter-of-fact today.

"We didn't want to take any chances," he remarked several times in speaking of the first days of aviation. "We were not trying for altitude in those days but were content if we could operate the planes ten or twelve feet off the ground. If we went higher, it was unintentional.

"Aviation today will be greatly benefitted by a tour such as you are making, just as long as it is made with safety so that it will inspire confidence in others. It is a mighty fine thing to do."

The greatest need of aviation today is to get the general public into closer contact with aeronautic activities so that many more persons will get a true picture of the status of aviation today. This lack of knowledge on the part of the public has prevented a more general acceptance of aviation. If nec-

essary, it is better to sacrifice the reputation of a pilot or airplane operator, if the cause of aviation can be served thereby. On the other hand, the Department of Commerce should be highly commended for increasing public confidence by licensing both planes and pilots.

The "Sky Fleet" tour has made available for both individuals and business organizations a large fund of facts and data on the cost of operation of a commercial air fleet over an extended period. It has proved that the airplane is not such a delicate mechanism as many persons believe and that it can be used, day in and day out, with no serious hazard from a mechanical standpoint; that it does not require a prohibitive amount of mechanical attention to keep it flying, although it cannot be used as universally as an automobile. The tour has instilled air confidence in thousands of persons and has contributed to public acceptance of aviation by persons who saw the fleet, who read of the tour, who rode in the ships, or who heard the radio talk descriptive of the tour.

amphibion planes during a flight from the Curtiss-Wright marine base at North Beach, Queens, New York City, to the company's base at Miami, Florida. One of the amphibions, a Sikorsky, was equipped with sending and receiving apparatus for both code and continuous wave telephone transmission, and the other, a Loening, carried code equipment. During the flight the planes kept in constant communication with each other and with shore stations by code, and the Sikorsky maintained communication with shore stations by radio telephone.

Roosevelt Aviation School Approved

ROOSEVELT AVIATION SCHOOL, Roosevelt Field, Mineola, L. I., has received a certificate of approval from the Department of Commerce, which covers all phases of ground and flying instruction including the transport pilot's course. The report of the Department of Commerce inspectors, upon which the certificate was granted, describes the training field free of ordinary air traffic and suited for the safe instruction of students, and approves the lighting equipment used to give night flying instruction in the transport course. The certificate of approval was based upon requirements which call for a staff licensed by the Department of Commerce and detailed approval of all flying equipment and courses of instruction.

UNDER an agreement recently reached between Air Associates, Inc., and United Aircraft Exports, Inc., the latter company will have exclusive sales rights in all foreign countries of Air Associates' aircraft and automotive equipment and materials. Shipments, according to the terms of the agreement, will be made by United Exports to all foreign countries from Garden City, L. I.

TWENTY-SIX women pilots held a meeting at Curtiss Field, Valley Stream, L. I., on November 2 to form an organization of licensed women pilots. A governing committee composed of pilots from different sections of the country was elected to have charge of the organization's activities. Mem-  
(Continued on next page)

CORRECTIONS ON OUR REPORT OF FORD TOUR

ATTENTION has been called to an error in Mr. Ralph Cram's story, "The Ford Tour in Retrospect," in the November issue of AERO DIGEST. It was stated in explanation of a change in positions among the leading ten, "Welborn's forced landing just after shoving off from Springfield washed out his landing gear." In regard to this error, Mr. Cram makes the following report and apology:

"Welborn, who was flying a Spartan, did not wash out a landing gear, as the summary at the end of my story showed him finishing ninth. The mistake was entirely my own, for while I made the notes for that portion of the story in conference with Art Schlosser, the efficient official scorer, I evidently confused Welborn's earlier delay from magnet trouble with another pilot's forced landing just out of Richmond, of which I had visible evidence from passing over it a few minutes later in the Condor.

And while I am correcting and apologizing, may I go on to present my compliments again to Mrs. Keith-Miller, and say that she pushed through the fog and landed second at Wausau instead of fourth, being preceded only by Wiley Post in his Lockheed. She deserves full credit for her fine flight that morning and throughout the Tour."

Novel Roof-Marking Device

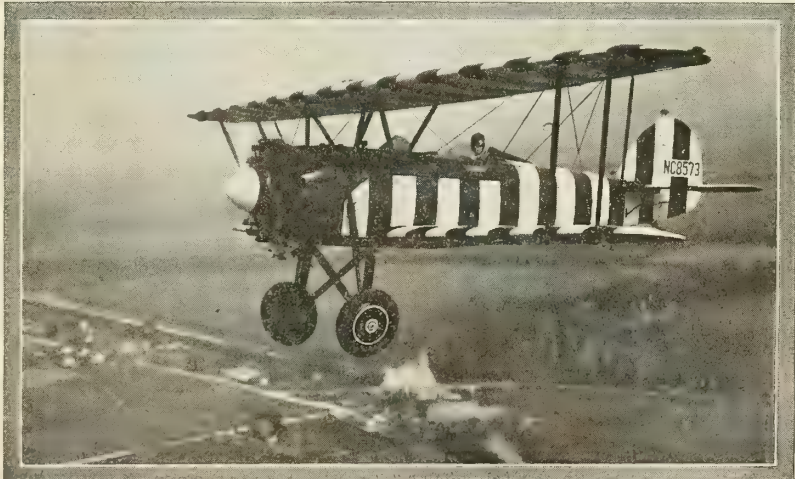
W. J. ROCHE has evolved a new form of roof-marking device which he claims will be widely used in displaying names of cities and towns on buildings for the use of airplanes in flight. Unit letters are employed; the base for the letter is constructed of 3/8" boards with two-by-four studding underneath. The size of each letter is five by nine feet, painted chrome-yellow on black background. The letters are purchased separately and fastened to the roof separately.

NEW YORK

SIXTEEN parachute jumps in less than one minute were made from a plane at Roosevelt Field, L. I., on November 10 during an aerial field day sponsored by the American Legion Aviators' Post No. 743. Fifteen men and one woman made the jumps from a Sikorsky amphibion at an altitude of 2,500 feet. The plane, which is the property of the New York, Rio and Buenos Aires Lines, was piloted by Harold McMahon.

EXPERIMENTS in two-way radio telephone and code communications have been completed by the Curtiss-Wright Flying Service. As a result of the tests, all planes of the marine division of the Curtiss-Wright Company will be equipped with radio telephone equipment, according to Major H. Brainard, vice president of the organization.

The experiments were conducted in two



Waco 220 Taper-Wing, with special paint job, owned by James B. Hall, New York City





Mr. F. Handley-Page (center) and a group of some of those who attended his lecture on the automatic slot at the Daniel Guggenheim School of Aeronautics at N. Y. U.

(New York News continued)

bership in the organization will be limited to licensed women pilots, and the purpose of the organization will be social as well as professional. It will encourage women in general to take up flying both for business and pleasure and to assist each other in securing positions as pilots.

**F.** HANDLEY-PAGE recently delivered a lecture on the automatic slot and slot control of airplanes before the students of the Daniel Guggenheim School of Aeronautics at New York University. Mr. Page is the inventor of the slotted airplane wing.

Among those who attended the lecture are those shown in the accompanying photograph. They are (left to right) Prof. Alexander Klemm, Dr. Loring Arnold, Capt. E. S. Land, Mr. Handley-Page, M. Henri Brunat, Gerard P. Herrick, Prof. William R. Bryans, Benjamin F. Ruffner, James B. Taylor and J. Werld.

**Curtiss Flying Service, at Valley Stream Airport, Valley Stream, L. I.**

**F**LYING courses conducted by the Curtiss Flying Service at Valley Stream Airport, Valley Stream, L. I., are given in conjunction with ground school work at New York University, New York City. The Curtiss school was approved by the Department of Commerce on August 14, 1929, to give ground and flying courses, in conjunction with New York University, leading to pilots' private and limited commercial licenses.

All flying courses in the school are given at the Valley Stream Airport. Ground school courses are conducted at New York University under the auspices of the Daniel Guggenheim Fund Committee on Elementary and Secondary Aeronautical Education. The ground school courses were prepared by

Roland H. Spaulding. Subjects covered in the private license course include twenty-five hours, ten hours of engines, ten hours of planes and five hours of air commerce regulations. The ground school course for the limited commercial license includes 50 hours, paralleling the curriculum of the private ground school course in addition to more advanced work. These courses are given at the university. The school is conducted on an academic basis, and sixty per cent of the students attending classes are flying students taking courses at the Valley Stream Airport. The ground school course includes both shop work and theoretical instruction.

The flying courses are the standard courses given in all schools of the Curtiss Flying Service. The private flying course includes twenty hours of flying, ten hours dual and ten hours solo. Frequent checks of the student's progress are made during his solo flying. At least one cross-country flight is given in the private course before the training is finished. The student then receives a final check on his ability to pass the Department of Commerce examination for a private license. The limited commercial course includes fifty hours of flying. Instruction includes steep turns, spirals, figure eights, cross-wind and side slip landings, landing and taking-off from small fields and acrobatics. Cross-country flying and practice in open and cabin type ships are included in this course. Training hours for the private and limited commercial courses may be arranged in the early morning or late afternoons and at week-ends so that a student may continue his regular occupation while taking a course.

Two hangars housing approximately forty-two training planes are located at the field, and three additional hangars will be constructed. The field is 300 acres in extent and is lighted for night flying.

### Work Begins on Ocean Airport

**A**NNOUNCEMENT has been made by Henry J. Gielow, Inc., of New York, naval architects, that all plans have been completed for the first of the so-called "Armstrong Seadromes," or floating airplane bases, and actual construction will start immediately. It will be named the *Langley* and will be anchored at sea midway between New York and Bermuda. Additional seadromes will be placed in operation within the next two years along the "great circle" crossing between America and Europe.

The seadromes are huge floating platforms with a 70-foot draft, supported on columns at intervals along both sides of the runway. Midway along the long structure is a wider space containing a hotel, hangars, shops, retail stores for the convenience of lady passengers on trans-oceanic airplanes, and well-stocked bars for the convenience of the masculine element.

**C**UTAJAR & PROVOST, INC., has been appointed advertising counsellor to the Curtiss-Wright Corporation on all airplane advertising. The units to be advertised through Cutajar & Provost will be: Travel Air Company, Moth Aircraft Corporation, Curtiss-Robertson Airplane Manufacturing Company, Loening Aeronautical Engineering Corporation, Curtiss Aeroplane & Motor Company and Keystone Aircraft Corporation.

**T**HE Air Ticket Office has moved from 535 Fifth Avenue to the Leftcourt Bank Building, 521 Fifth Avenue, New York City, where greater floor space has been acquired in a program of general expansion.

**S**EVERAL models of safety belts have been placed on the market by the Aerial Machine and Tool Corporation of New York City. Aerial Machine and Tool safety belts are equipped with quick releasing buckles and are heat-treated and cadmium plated. The buckle hooks have a forged web designed to prevent fingers from getting caught when releasing. They are made of leather and webbing, stitched with linen thread and are adjustable to accommodate all sizes.

**O**RDERS for 33 Savoia-Marchetti planes involving a total purchase price of \$540,200 have been received by the American Aeronautical Sales Corporation, a subsidiary of the American Aeronautical Corporation, manufacturers of the Italian planes in this country. The contracts include orders for twenty-four S-56 three place amphibians, six S-54 seven-place cabin seaplanes and three type S-55, the 14-passenger transport seaplane.

**R.** A. LOGAN, F.R.G.S., recently returned from Rhodesia, South Africa, where he was in command of an aerial exploring and mapping expedition over the tropical jungles of the Zambesi River Basin. Mr. Logan was formerly manager of the mapping division of the Fairchild Aerial Surveys of New York and is a former student of the Curtiss Flying Service.

The survey was made to determine the



best channel for navigation of the Zambesi River which is a natural waterway for hundreds of miles, obstructed in places by sand bars during the dry season. An aerial photographic survey of the river at the season of lowest water was decided upon by government officials as the best means of locating and mapping the exact route of the river channel. Eight hundred linear miles of vertical aerial photographs were made from landplanes and seaplanes, under the supervision of Mr. Logan.

EDWIN MAGRUDER, factory representative of the Russell Parachute Company of San Diego and New York, recently completed a 10,000-mile aerial tour of the West, Southwest and South. Mr. Magruder visited transport air lines, aviation schools and dealers on the tour.

Roosevelt Aviation School, Inc.,  
Roosevelt Field, Mineola, L. I.

A FIELD of 350 acres free from ordinary air traffic is utilized for the instruction of student pilots at Roosevelt Field, Mineola, L. I., by Roosevelt Aviation School, Inc. The Roosevelt School was approved by the Department of Commerce on October 23, 1929, to give ground and flying courses leading to private, limited commercial and transport pilots' licenses. Two hangars which house equipment for ground school training in connection with flying courses, repair shops and a fleet of fifteen training planes, including three types of ships for advanced flying, are located on the field. The lighting equipment used to give night flying instruction in the transport course has been installed. Adjacent to the training grounds is a field of approximately 500 acres equipped with airport facilities and utilized by commercial enterprises.

Roosevelt Aviation Corporation operates a ground school on 57th Street in New York City where a 100-hour course leading to the airplane mechanics license is given. Shop equipment includes five engines of different types, an airplane and airplane parts, and airplane welding and repair equipment. There is also an administration office and two lecture rooms. Courses given at this school are intended primarily for airplane mechanics. Flying students enrolled in the school for courses at Roosevelt Field are permitted to take their ground course at the New York City school if they prefer.

Flying students, whenever possible, are expected to take ground school courses at Roosevelt Field where a ground school is maintained especially for them. Only flying students may take the ground school course at the field. Subjects include, navigation, meteorology, aerodynamics, instruments and air commerce regulations.

The private pilot's course covers eighteen hours of flying, ten hours dual and eight hours solo. Lessons may be taken daily or in the student's spare time, and a schedule of instruction is arranged for every student. Training consists of straight flying, landings, take-offs, simple turns and banks, and twenty-five hours of ground school instruc-

tion. The limited commercial course covers fifty hours of flying and includes as many hours of dual flying as the student requires. Cross country flying is included in this course and a student is required to make at least one solo flight over a fifteen-mile triangular course. Fifty hours of ground school instruction is included in the limited commercial course.

Two-hundred hours of flying are given in the transport course, including fifty hours of dual and 150 hours of solo. Night flying and instruction in cabin plane flying is given in this course and 100 hours of ground school work is covered.

CENTRAL NEW YORK

[MILDRED MARVIN]

DEVELOPMENT of a private airport just west of the Oswego, N. Y., city line was recently started by Edward Joslin of Baldwinsville, a pilot at the Amboy Municipal Airport, and Francis Johnson, owner of the farm on which the field is located. The field will be known as the J. and J. Airport. Messrs. Joslin and Johnson have the distributorship for Eaglerock airplanes in Central and Northern New York.

A NEW addition to the Empire Air Transport hangar at Syracuse, N. Y., has been opened. It has a large auditorium which will be used as a class room and also includes a pilot's room, which has been fitted up with a piano and radio, a dormitory, a machine shop, offices and a cafeteria. A weather observatory room will be housed in a tower extending above the second floor, and equipment used by students in meteorology will be installed.

WITH the purchase of General Aviation Company by the Eastern Aeronautical Corporation, whose headquarters are at the Metropolitan Airport, Newark, N. J., it is announced that the company will continue under the name of General Aviation and will continue also its operations at Syracuse, Elmira and Geneva, N. Y. General Aviation are distributors for Stinson, Command-aire, Barling low-wing monoplanes and Arrow sport biplanes.

NORTHERN NEW YORK

[ROLLIN JONATHAN FAIRBANKS]

THE New York State Tax Commission recently ruled that the Watertown Municipal Airport is exempt from taxation under the agreement between the City of Watertown, N. Y., and F. H. Taylor, Inc., lessee of the airport. This ruling was requested by the city officials after the assessors of the town of Hounsfield attempted to place a tax on the property.

COURSES in ground school instruction are being conducted by the Extension Department of Union College, Schenectady, N. Y., in coöperation with Colonial Flying Service. The course runs for ten weeks and consists of 70 units of work divided among seven courses. Theoretical instruction is given two nights a week at Union College under the direction of Professors P. I. Wold, J. M. Hyatt and M. F. Sayre of the Physics

Department of Union College. Practical instruction is given one night a week at the Colonial hangar at Albany under the direction of Capt. W. Hale Francisco, division superintendent of Colonial Flying Service at Albany, and Bert Green, chief mechanic.

The course of instruction includes: airplanes and airfoils, aircraft engines, instruments and parachutes, navigation, airports and meteorology.

NEGOTIATIONS have been completed by Aviation Consolidated, Inc., for the purchase of land at Plattsburg, N. Y., which will be developed into an airport. Aviation Consolidated recently acquired control of Royal Palm Airways, Inc., which originally instigated negotiations for the purchase of the property.

Aviation Consolidated has begun development of the new airport which is scheduled to go into operation next spring. Black and Bigelow, airport engineers, has completed a survey of the property and plans have been prepared to install a complete airport lighting system.

THE sale of 245 open-cockpit training planes was made by Fleet Aircraft, Inc., of Buffalo, during the first nine months of operation by the company which was incorporated in February, 1929, according to a recent report of the company's officials. The Fleet plane is the commercial adaptation of the Consolidated Husky training plane manufactured for the military services by the Consolidated Aircraft Corporation of Buffalo. Fleet Aircraft, Inc., a division of the Consolidated firm, operates as a separate company.

NEW ENGLAND

THE first engine was tested recently by the Pratt and Whitney Aircraft Company in the company's new plant at East Hartford, Conn. The engine was constructed in the old plant and transported to the new factory, where it was run for about 45 minutes. During the test an inspection party observed at different locations throughout the plant the noise made by the engine during the run, to test the sound-proof qualities of the test house. The Pratt and Whitney company will occupy the machine shop in the new plant about January 1, 1930, and the office department will be installed by January 15th.

THE Bourdon Aircraft Corporation of Hills Grove, R. I., has been consolidated with the Viking Flying Boat Company of New Haven, Conn. The plant and equipment of the Bourdon Corporation will be moved to the Viking factory at New Haven. The Viking Flying Boat Company will manufacture the Kitty Hawk plane in addition to the Viking flying boat and amphibian, which is an American interpretation of the European Schreck FBA. The Kitty Hawk plane was developed by Allen P. Bourdon and Franklin T. Kurt. Two approved type certificates have been issued for its design, the first, No. 134, was for the plane with the Siemens 110-horsepower engine, and the sec-

(Continued on next page)



(New England News continued)

ond, No. 166, with the Kinner 100-horsepower engine. The Kitty Hawk has an overall length of 21 feet 11 inches and a wing span of 28 feet. It is a two-place plane and has a cruising radius of 450 miles.

THE West Coast office of the Pratt and Whitney Aircraft Company of Hartford, Conn., has been opened in the Petroleum Securities Building, Los Angeles, Calif. The office will be under the supervision of E. B. Haines, who is in charge of Pratt and Whitney sales and service on the West Coast.

#### Booklet Issued by Barbour Stockwell

BARBOUR STOCKWELL COMPANY of Cambridge, Mass., has issued a Booklet No. 11 which lists the complete line of panels, tachometers, flexible shafting, adapters and other aircraft parts, manufactured by the company.

MISS NOVETAH HOLMES, formerly assistant publicity director of the Fairchild Aviation Corporation, has joined the Sikorsky Aviation Corporation at Bridgeport, Conn., as assistant publicity director. Miss Holmes is a student flier, and will continue her course at the Bridgeport Airport, which adjoins the Sikorsky Plant.

[WALTER S. ROGERS]

NEW ENGLAND, with additions to and improvements of airports, and excellent flying weather, has been more active this fall in aviation than ever before. To stimulate public interest in Massachusetts, there have been numerous air meets—Boston's first air meet, Brockton air meet, Whittall field, Worcester air meet, Marlboro air meet, and a proposed air meet at Newburyport.

AT the Boston Municipal Airport the old National Guard hangars and administration buildings have been removed. One building remains which prevents the use of the all-direction 2,000-foot runways. The new memorial portico, which will house the administration office, State and Federal offices, as well as offering complete facilities as an airport station, is nearly completed. The radio beacon at the field is now in regu-

lar service. A permanent weather bureau is also to be maintained along with the radio service.

THE A.M.A.C. Glider School at South Wellfleet, Cape Cod, has closed for the season. It is expected to be opened early next spring, when a new launching device, developed by Heinrich Knott, will be used.

CURTISS FLYING SERVICE announces that Harry Depew Copland, who has been in charge of the Curtiss flying school at Martha's Vineyard this summer, has been appointed operations manager for the Boston division. Wm. J. Ahlstrom, formerly operations manager, has been transferred to the Providence division. Lowell R. Bayles, Curtiss pilot, has been transferred back to his former home in Springfield, Mass., where he will act as chief pilot for the Curtiss Service.

## NEW JERSEY

UNDER an agreement with the Upperburnelli Corporation of Keyport, N. J., the Societa Trans-Adriatica of Italy will commence within the next 90 days the manufacture of airplanes using Burnelli patents. According to the agreement entered into, the Italian concern will manufacture not less than 50 Burnelli planes a year for a period of five years. The type of plane to be built by the Societa Trans-Adriatica of Italy is the standard Burnelli 20-passenger, all-metal monoplane. This transport has a wingspread of 90 feet and a cabin 12 feet wide, 6 feet high and 22 feet long. The monoplane has a high speed of 160 miles per hour, and a landing speed of 45 miles per hour.

RAY L. HOWARD has been appointed sales engineer of the Fokker Aircraft Corporation of America. He succeeds Charles Froesch who has been appointed general service manager with headquarters in New York. Mr. Howard has been associated with the Fokker company for nine years, since its inception in the United States. His headquarters will be at Fokker Field, Hasbrouck Heights, N. J.

TESTS of a deluge type of sprinkler system of fire extinguishing were conducted by the City of Newark on November 20 in the hangar recently constructed for Colonial Airways, Inc. For the purpose of testing the system, several airplanes were saturated with gasoline and ignited. The experiment was sponsored by the National Board of Fire Underwriters with the cooperation of the Aeronautical Chamber of Commerce of America.

## PENNSYLVANIA

A TEST flight of the Brownback C-400 radial type airplane engine has been made at Buffalo by the Brownback Motor Laboratories of Pottstown, Pa. For the purpose of testing, the C-400 was installed in a two-place Fleet plane and was flown for one hour and fifty minutes with propeller set 14½ degrees, turning 1,400 revolutions per minute on the ground and 1,775 revolutions per minute in the air. The Brownback airplane engine established a high speed of 103.5 miles per hour and a rate of climb of 640 feet per minute. Fuel consumption was .55 pounds per horsepower at full throttle.

AN All-Pennsylvania Air Tour of one week's duration is planned for next May by the Aero Club of Pittsburgh. A tentative route has been formulated, covering the entire state. Louis T. Barry, president of the Aero Club of Pittsburgh, has appointed the following members to a committee formed to supervise the All-Pennsylvania Air Tour: John Vickers, chairman; William J. Austin, vice-chairman; Halsey R. Bazley, James D. Condon, Lorin C. Faurot and John P. Morris.

THE Pennsylvania State College has developed a three-year course in aeronautics to be given at its branch schools throughout Pennsylvania, under the supervision of the Department of Engineering. A home study course which includes a study of the elements of mechanical flight will also be conducted by the college through the mails.

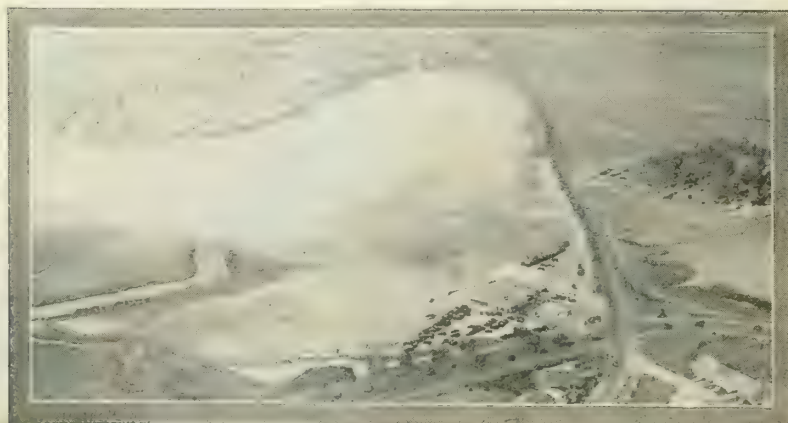
## PHILADELPHIA

[RUSSELL GARD]

THE Ac., first commercial aircraft engine to be manufactured in Philadelphia, which was recently granted an Approved Type Certificate by the Department of Commerce, is now being put into production by the Aircraft Engine Corporation, of Philadelphia.

Al Jacobs is developer and designer of the engine. The engine, a seven-cylinder air-cooled radial type, has a bore of four and one-half inches, a stroke of four and three-quarter inches, and compression at ratio of 4.75 to 1. It develops 140 horsepower at 1,800 revolutions per minute. Weight is 370 pounds, giving a ratio of weight to power of two and one-half pounds per horsepower. Piston displacement is 528 cubic inches.

BALTIMORE AIRWAYS, INC., has made Central Airport at Camden, N. J., a stop on its Baltimore-New York run.



Aerial photograph of Dennison Airport, near Boston, Mass.

**SURVEY** of an air route from Columbus, Ohio, to Philadelphia was recently begun by Grant N. Berryman, superintendent of the airways extension division of the Aeronautics Branch, Department of Commerce. The route will be from Columbus to Richmond, Va., and thence to Philadelphia. An emergency landing field at Newark, Ohio, is the first of several on the route to be established.

**A**N additional hangar has been constructed at the new Somerton Airport, located on the outskirts of Philadelphia. The new building was built in order to accommodate additional privately-owned planes.

**THE** Wings Corporation, newly formed concern holding the Waco distributorship for Philadelphia territory, has established its offices and sales base at Central Airport, Camden. William B. Eagleson, J. Story Smith, and Jack Bartow are the incorporators of the new company.

**C**HESTER C. CHARLES, Department of Commerce inspector for the Philadelphia district, has removed his headquarters from the Philadelphia Airport to Central Airport, Camden. He has his office in a temporary building pending the construction of the new administration building at the airport.

**THE** Airport Development and Construction Company of Philadelphia has completed a preliminary report of the site selection for the proposed Bridgeton, N. J., Municipal Airport.

## PITTSBURGH

[BOB COATES]

**NO** more applications can be accepted for the University of Pittsburgh's aeronautical engineering course until February when the second semester opens, according to Dean E. A. Holbrook. Fifty students are now enrolled in the course. Applications are being accepted for the ground school course being offered by the University in coöperation with the Pittsburgh Aviation Industries Corporation.

**NEW** officers of the Pittsburgh Aero Club which were elected recently are as follows: Raymond Marlier, first vice president; Capt. Austin, second vice president; Capt. Jack Morris, third vice president, and Edward W. Thompson, treasurer. The board of governors includes Robert A. Laedlein, Herbert V. Thaden, Col. Harry C. Fry, Bertram H. Smyers and William B. Rodgers. It has been announced that the club will hold monthly evening meetings in the future.

## DELAWARE

**UNDER** the terms of an agreement between the Bellanca Aircraft Corporation and the Wilmington Chamber of Commerce, the airport adjoining the Bellanca factory at New Castle, Delaware, will be known as the Bellanca-Wilmington Airport. The Bellanca Corporation will equip the field and establish day and night radio service. It is to be used as a public airport operated by the Bellanca

interests. The Chamber of Commerce will install lighting equipment and aid in the work of general development.

**A** TRANSPORTATION sales department has been organized by the Industrial Finishes Division of E. I. du Pont de Nemours and Company, Inc., of Wilmington, Del. The new sales department will include aviation, railway and marine activities.

## MARYLAND

**E**RECTION of a building housing an aerodynamical laboratory, including a wind tunnel, has been completed by the Berliner-Joyce Aircraft Corporation of Baltimore. The building, laboratory and tunnel were designed by the research staff of the Berliner-Joyce corporation under the direction of William A. Miller, chief of research, and constructed by the M. A. Long Corporation of Baltimore. A research program formulated by the research staff includes tests in connection with the development of a new form of lateral control, and a study of an auxiliary device for increasing the effectiveness of the horizontal tail surfaces of a plane under spinning conditions.

The building is constructed of brick and steel and is 120 feet long by 50 feet wide. Two observation chambers are provided, one extending above the building's roof and containing illuminated and ventilated space for research personnel.

The wind tunnel is of the double return, open jet type. Elimination of vanes, honeycombs and other forms of air straighteners embodied in its construction will permit an estimated air speed of 120 miles per hour at the open jet of the tunnel. The tunnel fan is operated by a 250-horsepower electric motor, powered by a 350-horsepower electric generator providing direct current. The generating plant is located in a building adjoining the laboratory. A six component balance, designed to measure simultaneously the forces along, and moments about, three mutually perpendicular coördinate axes is also installed.

**A**N eight million candlepower beacon has been installed at the Del-Mar-Va Airport, Hebron, Maryland, as the first step in a program of general development. The beacon is placed on a steel tower adjacent to the main hangar and revolves at six revolutions per minute. It is visible at a radius of approximately fifty miles. An additional fifty acres has been added to the Del-Mar-Va Airport, bringing the field to over 250 acres in extent.

Starlighters, Inc., owners and operators of the Del-Mar-Va Airport, are distributors of Challenger, American Eagle and Fairchild planes.

**V**INTON HIGHBIE, project engineer for the Berliner-Joyce Aircraft Corporation of Baltimore, has been appointed instructor of aeronautical drafting at the Maryland Institute. The course which Mr. Highbie will conduct requires four years' work, the first year devoted to elementary drafting and the last three years covering specialized phases of aeronautical drafting. Charles Wald, for-

merly senior inspector of airplanes for the Bureau of Aeronautics, has been appointed inspection engineer for the Berliner-Joyce corporation.

## BALTIMORE

[E. W. WALSH]

### First Baltimore Aircraft Show Dec. 9-14

**A**IRCRAFT manufacturers and distributors of Baltimore and those of other sections of the East are making plans for the first Baltimore Aircraft Show, to be held December 9 to 14 at the Fifth Regiment Armory, Baltimore, Md. More than thirty planes of various kinds have been entered, and it is expected that the total number of entries will be about forty when the show opens. Forty extra booths have been added to the original floor plan layout of eighty-five. The first Baltimore Aircraft Show is being sponsored by the Flying Club of Baltimore with the endorsement of the Baltimore Association of Commerce.

Among the planes entered early for the exhibit are a Bellanca monoplane, two Berliner-Joyce biplanes, two Doyle monoplanes, a Bird biplane, a Cessna monoplane, three Challengers of various types, two Fairchild monoplanes, two Curtiss Robins, a Curtiss Thrush, a DeHaviland Moth, a Lockheed Vega monoplane, three types of Travel Air planes, a Waco biplane, a Consolidated Army plane and a Command-Aire.

Possibly one of the most interesting features of the first Baltimore aircraft exhibit will be that section of the show devoted to sport model planes. Entries to date of these sport craft show many designs. A model airplane exhibit will be held in connection with the first Baltimore Aircraft Show. Cups will be awarded by the show management and the Curtiss-Wright Flying Service for these entries. The planes entered in the model exhibit will be judged from the standpoint of appearance, and those which are strictly scale models will be judged from the standpoint of their accuracy of detail.

### Curtiss-Wright Mechanics School in Baltimore

**A**NIGHT school for the training of aviation mechanics was opened recently in Baltimore, Md., by the Curtiss-Wright Flying Service. The school is being conducted at the headquarters of the flying service on North Charles Street. According to Major William D. Tipton, general manager of the Service in Baltimore, the course, which will cover six months, was opened in anticipation of an increased demand for mechanics.

Seven instructors will be in charge of the school. There will be twenty hours of lectures on fundamental theories and the balance will be shop practice. A complete airplane and five airplane engines will be used in the instruction work. Instruction will be given in the theory of flight, balancing and checking pitch of propellers, repairing of engines and instruments, construction, repair and maintenance of aircraft. Special emphasis will be laid on welding as one of the most important features of airplane construction. Each student will be given at

(Continued on page 214)



# When you're trained by



*In 15 years of teaching flying  
to over 3,000 student-pilots, Curtiss-Wright  
has an unparalleled record for SAFETY*



The famous Robin—and the Fledgling—are standard Curtiss-Wright training equipment.



Curtiss-Wright Schools give a thorough working knowledge of all types of engines and ships.



Class-room theory and the practice of flying go hand in hand in the Curtiss-Wright schools.

CURTISS-WRIGHT'S record for teaching *safe* flying can't be approached by any other school. A total operations record of 15 years of deliberate and thorough training . . . over 3,000 students taught . . . thousands of hours in the air . . . over 5 million miles flown in dual and solo training.

Over *half* the accidents in the air are due to pilots' errors, just as most of the automobile accidents are due to reckless or inexperienced driving.

You aren't safe in the air or on the road unless you are so *well-trained* that you don't make mistakes.

You can learn to fly in plenty of schools—but with Curtiss-Wright you get a sound and thorough training designed to eliminate pilots' errors.

First—Curtiss-Wright instructors are not only experienced pilots who don't make mistakes *themselves*—they know how to teach *you* to fly so that you're as much at home in a plane as in an auto-

mobile. When you've had this training, you aren't going to take reckless chances and go into a tail spin . . . you aren't going to violate safety regulations . . . you aren't going to make mistakes!

Second—Curtiss-Wright equipment is *safety*-equipment. Curtiss-Wright has been responsible for most of the safety factors in engines and planes ever since Glenn Curtiss and the Wright brothers designed and flew the world's first successful airplanes.

Practically every method of making planes and engines safe is either a Curtiss-Wright development or has been adopted by Curtiss-Wright. Their training planes are standard equipment in the U. S. Navy and are built according to 20 years' experience in designing and building the world's finest and safest air equipment.

Finally—when you've finished Curtiss-Wright training, you have a solid foundation in *all* phases of aviation. You aren't just a pilot . . . you are a *well-trained* airman who can hold his own any time . . . anywhere.

And you have so many *other* advantages if you get your training in a Curtiss-Wright school! You learn any branch of aviation you want to learn. You are associated with men who are responsible for a nation-wide business-of-the-air. You have exceptional opportunities for getting the job you want . . .

But we can't tell it all—here. For further information, mail in the coupon—today.



You're always right in the middle of a hustling, bustling center of aviation activities.

## CURTISS-WRIGHT

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## *you're safe in the air*



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Dallas, Tex.	Rockland, Me.
Denver, Colo.	St. Louis, Mo.
Detroit, Mich.	San Francisco, Cal.
Hartford, Conn.	Springfield, Mass.
Houston, Tex.	Syracuse, N. Y.
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## FLYING SERVICE

*The World's Oldest Flying Organization*



(Maryland News continued)

least three hours of instruction in every individual operation that goes into airplane construction and maintenance.

### Baltimore Schools of Aeronautics Opened

THE Baltimore School of Aeronautics, which opened its doors October 26 to teach airplane mechanics, has an enrollment of more than 100 students. The course at the school embraces instruction in aircraft motor construction, fuselage and wing construction, and aircraft welding. The course is six months in duration. The classes are divided into divisions so that students who are concerned with design, sheet-metal work, wing fabrication and other phases of manufacturing can select the particular work in which they desire to specialize.

Thomas E. Pell, general superintendent of the Berliner-Joyce Aircraft Corporation of Baltimore, is president and director of the school. E. F. Cummings is vice-president.

WILLIAM WHITEHURST is now manager of the Baltimore Airports Terminals, Inc., a division of the Curtiss Airports Corporation. Mr. Whitehurst has charge of all the physical property at the proposed Curtiss-Wright airport at Baltimore and will endeavor to draw airlines to Baltimore. He will superintend the service given at the airport to the lines operating out of the terminal, and will oversee all construction work at the field during and after its construction.

A CHARTER for the Baltimore Airport, Inc., a corporation which plans to operate an airport just outside of the city limits of Baltimore, Md., was filed recently with the Maryland State Tax Commission.

The officers of the corporation are Frederick Neeseman, president; Howard W. Jackson, first vice-president; John G. Walling, second vice-president, and Oliver B. Rutherford, secretary and treasurer. Besides the officers the directors include, Dr. J. S. Carroll, Herman J. Liebno, P. J. McEvoy, Frank M. Krasmer, Charles R. Neeb, C. L. Ofenstein and J. Leroy Hopkins.

The new corporation will cooperate with the Atlantic Seaboard Airways, giving Baltimore direct connection with transcontinental lines. Lines will be operated from Baltimore to Washington, New York, Atlantic City, Norfolk, Newport News and to western cities.

### Baltimore-Newark Air Service Opened

DAILY passenger service between Baltimore and Newark was inaugurated on October 22nd, when ten passengers in two Bellanca monoplanes made the first trip on the new line, which is sponsored by Edward Handler, president of the Calvert Securities Corp. and owner of Handler Field, Baltimore, from which point the service is conducted.

The service was inaugurated for the purpose of giving citizens of Baltimore ample time for business and shopping in New York without requiring them to send eight hours on the train. The fare is \$25 for one way and \$40 round trip.

## VIRGINIA

[MARJORIE B. EICHEL]

A PILOT balloon service and a fifty-foot steel observation tower are among the latest improvements at the Richard E. Byrd Airport at Richmond, Va. These new developments of the United States Weather Bureau will soon be put into operation. The observation tower is the second of its kind to be built at an American airport.

A STEADY increase in the mail carried through Richmond has caused Pitcairn Aviation of Virginia, Inc., located at Richmond, to discontinue student instruction and sightseeing flights. Planes may be chartered only for long distance flights.

G GOVERNOR HARRY F. BYRD, accompanied by a large party of Virginia officials, took off from Richmond on November 21, for a three-day air tour of the state. The itinerary of the tour was so arranged that the state was almost entirely covered. The purpose of the tour was to study aviation conditions in Virginia.

## N. CAROLINA

[LENWOOD J. FULLER]

PLANS have been announced for an Asheville flying club to be established at Brickton on the field of Blue Ridge Aircrafts, Inc. The club will be known as the Asheville-Hendersonville Flying Club, and will have thirty members, each member being entitled to one share in a plane to be purchased by the club. The training to be given by the club will include ground work, rigging, day and night flying instruction and stunt flying.

A CONTRACT for the lease of the Asheville-Hendersonville Municipal Airport near Fletcher, North Carolina, to the Pocahontas Air Transport Company of Bluefield, West Virginia, was approved recently by the Airport committee of the Asheville Chamber of Commerce. The contract states that the company will erect buildings for the field including a hangar to house seven planes. Pocahontas Air Transport has let the contract for the construction of an administration building which will have offices, lounging rooms, shower baths and other facilities.

The Chamber of Commerce recently let the contracts for the construction of two large runways, one to be 3,500 feet long and the other 2,000 feet long, and a drainage system for the entire field. The all-weather four-way landing field will be completed for its formal opening December 1. The field will be equipped with a lighting system, including floodlights and boundary lights, and water and telephone systems will be installed.

## GEORGIA

AIRWAY marking will appear immediately on roofs of the Standard Oil Company plants in Georgia, Alabama, Florida, Kentucky and Mississippi, according to announcement made by W. E. Smith, president of the Standard Oil Company, incor-

porated in Kentucky. The Atlanta-to-Jacksonville route will be marked by painting the roofs of Standard Oil plants at Hapeville, Covington, Griffin, Milledgeville, Macon, Americus, Albany, Fort Valley, Dublin, Cordele, Helena, Eastman, Fitzgerald, Douglas, Baxley, Waycross, Ga., and Callahan, Fla. The Atlanta-to-Birmingham route will be marked by painting the roofs of Standard Oil plants at Atlanta, Fairburn, Douglasville, Carrollton, Ga., and Roanoke, Anniston, Talladega, Gadsden, Pell City and Birmingham, Ala. In addition, the Louisville-to-Lexington, Louisville-to-Cincinnati, Memphis-to-Louisville, Memphis-to-New Orleans, Birmingham-to-Vicksburg, Birmingham-to-Mobile, Miami-to-Jacksonville, Tampa-to-Jacksonville, Jacksonville-to-Savannah, and Jacksonville-to-New Orleans, air routes will be marked on over 100 Standard Oil plant roofs.

## FLORIDA

[JOHNSON WRIGHT]

MIAMI, Fla., is to be the training base for crews of dirigibles the construction of which was recently started by the Goodyear-Zeppelin Co. Construction of an airship hangar at the Miami Municipal Airship Base is nearly completed and small blimps of the *Pilgrim* and *Puritan* types will soon be sent to Miami to begin training operations.

A GLIDER division has been organized in the Greater Miami Airport Association of Miami, Fla. J. S. Gibbons is temporary chairman of the organization. A committee is investigating the purchase of a glider for the members who are to be limited to twenty.

THE International Flying Service has leased the entire south portion of San Marco Island between Miami and Miami Beach for a seaplane base for winter operations. Three ramps will be constructed there and another on the Miami Beach side of the Seventy-ninth Street causeway, the latter to be an auxiliary base.

ESTABLISHMENT of a state bureau of aviation as a unit of the Florida Chamber of Commerce for capitalizing major and minor activities for development of aviation in Florida was urged at a statewide aviation conference attended by representatives of 35 cities and held in the Columbus hotel at Miami, October 12.

During the conference plans were completed for an air tour that will visit practically every city in the state that has a suitable airport. The tour is to be staged following the All-American Air Meet in Miami, January 13, 14, 15. The tour has been sanctioned by the National Aeronautic Association.

### Pitcairn to Operate in Orlando, Fla.

ACCORDING to a telegram from T. P. Caldwell, Florida representative for Pitcairn Aviation, Inc., Pitcairn has closed negotiations with the city of Orlando, Fla., for the operation of a Ford trimotored trans-

port which the company will place in operation there for the winter season.

Special charter tours and regular scenic flights will be made.

[J. M. MURRAY]

**C**OMPLETION of the proposed \$750,000 island airport for Tampa would increase city taxes less than 51 cents on \$1,000, it was announced recently by City Comptroller Steuart. It is planned to build the island without bulkheads, as the sloping shore line will act as a counter breaker against high waves.

A barge has been painted chrome yellow and black to be used as a temporary seaplane base. The float will be equipped with a lighting plant. The bay adjacent to the temporary seaplane base is sufficiently deep to permit planes to taxi to the barge, and straight-of-ways in two directions permit easy take-offs.

Income derived from hangar rentals, concessions and miscellaneous sources within ten years will yield sufficient funds annually to pay the interest and sinking fund on the proposed airport and seaplane base, and take care of all operating expenses, according to a financial statement prepared by R. Wallace Davis, superintendent of public works, and aeronautical advisors assisting in preparing data supporting the airport bond issue. The statement gives operating expense and fixed charges for bond retirement and depreciation of equipment as \$89,200 a year as compared with an estimated total of \$90,600 a year from all sources.

With the completion of Tampa's proposed island airport, the New York, Rio and Buenos Aires Line will spend approximately \$75,000 in equipping the field with its own hangars and other facilities, according to an announcement made by George F. Harris, South American traffic manager for the company. The hangar will be constructed to house ships to be kept in reserve at Tampa. In announcing the company's plans for the development of the airport, Mr. Harris stated that the plans for the island field had met with the approval of his firm, recognizing Tampa as a natural port of entry from the South American countries.

**A**LL officers and directors of the Greater Miami Airport Association were re-elected recently to serve for another term of twelve months. Officers are: Glenn H. Curtiss, honorary president; R. V. Waters, president; J. E. Yonge, Walter W. Burns and L. E. Goodrich, vice presidents; C. D. Leffler, treasurer, and A. H. Heermance, executive secretary and assistant treasurer. Directors are: B. B. Freeland, Mr. Yonge, Hollis Bush, S. P. Robinson, Francis Miller, C. S. Nichols, O. A. Sandquist, A. E. Curtis and R. M. Davidson.

Mr. Heermance announced that prizes for aviation work by Miami high school boys have been pledged by the Claude Nolan Co., Pollock & Berg, the Red Cross Pharmacy, and the airport association. The association is fostering contests among the Miami high school boys for the longest outdoor flight and the longest indoor flight of a model plane, for the best experimental

engineering work, and for the best scale model plane to be entered in a national contest.

## CUBA

**T**WO airplane service companies have been organized in Cuba and are operating airplane taxi service, aerial survey, sightseeing flights and chartering of planes. They are the Cuban Flying Service, Inc., sponsored by the Fairchild Aviation Corporation which is a subsidiary of the Aviation Corporation, and Compañía Nacional Cubana de Aviación Curtiss, formed by Intercontinent Aviation, Inc., a subsidiary of the Curtiss-Keys group of aviation companies.

The Compañía Nacional Cubana de Aviación Curtiss will operate at an airport located at the town of General Machado, a suburb of Havana. The site has been purchased and work on general development of the field and the construction of two hangars has begun. An administration building to house the general offices of the company and a ground school under the Curtiss system of instruction will be constructed. Six Curtiss Fledgling training planes will be sent to Cuba for use by the company, also three Curtiss Robins, a Curtiss Falcon and two Ireland amphibians.

Officers of the Compañía Nacional Cubana de Aviación Curtiss include: W. D. Pawley, president; Dr. Pablo Carrera Justiz, executive vice-president; C. I. Morton, vice president; Thomas Doe, vice president, and John Sanderson, treasurer.

Cuban Flying Service, Inc., is operating at Columbia Field, Havana. Two passenger planes have been flown from Roosevelt Field, L. I., for use by the company. Charles M. Ewan will take charge of aerial photographic survey and mapping operations in Cuba.

## ALABAMA

[ORA C. JONES]

**T**HE dirigible base at Gadsden, Ala., on the property of the Goodyear Tire and Rubber Company has been completed and is now ready for the use of the company's blimps. It is large enough for any airship in the Goodyear fleet.

**T**HE Standard Oil Company has instructed all its branches in Alabama to airmark their plants by placing the name of the town in which the plant is located on the roofs. Similar instructions have been issued to branches in surrounding states.

**G**ORDON KUSTER, of the Birmingham Junior Chamber of Commerce, has been appointed Birmingham representative of the Delta Air Service. The company operates the airline passenger service between Birmingham and Dallas.

**A** SURVEY for available sites for a municipal airport was made recently at Gadsden, Ala., by Maj. Sumpter Smith, of the One Hundred and Sixth Observation Squadron, Birmingham. The city of Gadsden has been planning for a new port for some time.

**A** FOUR-YEAR course which leads to a Bachelor of Science degree in aeronautical engineering is offered this fall at the University of Alabama, Tuscaloosa, for the first time. Leslie Walker, of Birmingham, is the instructor in charge of the course.

## TENNESSEE

[VIRGINIA MATTHEWS]

**A** CHAPTER of the National Air Cadets has been formed at Harlingen with more than 30 youths of Harlingen High School signing up for ground school training. Bill Floyd is squadron commander, and Bryon Scott is acting adjutant. Former Army Air Corps officers that will give the instruction are Lieut. Claude Carter, Lieut. V. V. Pernoud, Capt. W. H. Scott and Charles Perry.

## CHATTANOOGA

[JAMES S. LINDSEY]

**D**EAN CHARLES FERRIS, of the University of Tennessee College of Engineering, recently announced that a preliminary course in aeronautics will be offered beginning December 1. The course will include ground instruction only, familiarizing students with the operation of engines and plane construction.

**T**HE Tullahoma, Tenn., Exchange Club is making an effort to complete the local airport at Camp Peay. The club has assumed the responsibility of clearing the approach to the field on all sides.

A revolving beacon has been installed and there will be thirty-five boundary lights, five obstruction lights and two course lights installed when the lighting plans are completed. The Tullahoma emergency field is on the air mail route between Chattanooga and Nashville. The field is a mile and a half east of Tullahoma on a state-maintained road, provided with lights and water, fire protection and a resident attendant.

## KENTUCKY

[A. W. WILLIAMS]

**A**DDISON W. LEE, president of the Louisville and Jefferson County Air Board, which has charge of Bowman Municipal Field, was air representative on the city committee in charge of celebrations on Oct. 31, in connection with opening of a new \$5,000,000 municipal bridge across the Ohio River, between Louisville and Jeffersonville, Ind. This bridge will give a ten-minute connection between the new Willson airport west of Jeffersonville, Ind., and Louisville, making it the field most accessible to Louisville. The field is being gradually developed, the first need being a good stand of turf, and drainage.

[J. ROGERS]

**A**N air show which included stunt flying at night and a glider exhibition was held as one of the celebratory features of the dedication of the new municipal bridge that

(Continued on next page)



(Kentucky News continued)

spans the Ohio at Louisville and joins Kentucky and Indiana at that point. Addison W. Lee, Jr., president of the Louisville and Jefferson County Air Board, and Captain F. E. Galloway, commandant of the military unit at the municipal airport, Bowman Field, were in charge of the exhibition.

A glider of Gliders, Incorporated, Lake Orion, Michigan, took part in the exhibition, and three Army aviators from Wright Field, Dayton, and five planes from the National Guard Post, Indianapolis, took part in the demonstration. The Army fliers attending were: Captain St. Clair Street, Lieut. James Parker and Lieut. Wendell Brookley.

## OHIO

[T. E. LUNSFORD]

**P**ASSENGER service on the Continental Air Lines operating between Cleveland, Columbus, Cincinnati and Louisville, has been discontinued and only mail will be carried on this route in the future. The Continental firm is a subsidiary of the Universal Aviation Corporation.

**C**ONTRACTS for the design and construction of a hangar for land and seaplanes and for an aircraft factory building have been acquired by the Austin Co., Cleveland. The hangar, to measure 100 feet by 120 feet and cost \$40,000, will be built at Round Hill, Mass., for Col. E. H. R. Green. The factory is the first unit of the aircraft plant to be built for the Crosley Airplane Co. on its 193-acre airport at Sharon, Ohio. It will measure 100 by 120 feet and will be of brick and steel construction. The first unit of the factory will be devoted to experimental work in connection with aircraft construction, according to Powell Crosley, Jr., president of the Crosley firm.

**T**HE University of Dayton will conduct evening courses in elements of aerodynamics and airplane design, according to Rev. Bernard P. O'Reilly, president of the university. Dr. Giovanni P. Casiraghi, doctor of mechanical engineering and naval architecture, and at present the aeronautical engineer with the Rinehart Whelan Co., will conduct the courses.

### Cincinnati's First Aviation Show Feb. 8-15

**C**INCINNATI'S first aviation show will be staged from February 8 to 15, 1930, in Music Hall, Cincinnati, Ohio. T. Higbee Embry, president of the Embry-Riddle Company, is chairman of the executive committee which has been formed to supervise the aviation show. Other personnel of the committee includes: Ralph Heaton, Jack Rowe, J. W. Pattison, Alfred Hill, J. G. Colgan, John Paul Riddle, Robert Doepeke, Warner P. Sayers, Hugh Watson, R. F. Burckhardt, Joe R. Deins and Louis D. Mueller.

**A.** F. WHITE has been appointed Eastern representative of the Gruss Air Springs Company of America. Mr. White is a former Lieut. Commander in the Naval Air Service and was formerly sales manager of International Aircraft. His headquarters will be located at Dayton, Ohio.



Robert P. Hopkins, N.A.T. pilot, and his plane after its recent night landing

**R**OBERT P. HOPKINS, pilot on the Cleveland-Chicago air mail route of the National Air Transport, recently made a successful forced landing in a fog on a small plot of ground in Edgewater Park, Cleveland. Hopkins had flown over fog on the entire route from Chicago, being guided by the radio-beacon at Cleveland. Arriving over the Cleveland field, he was unable to find a hole in the fog for landing at the field, and, as his fuel was nearly exhausted, he came down on the narrow stretch of ground in the park along the lake front. The landing gear of the mail plane was slightly damaged in the landing.

**A**N airport was dedicated on November 11 at Lisbon, Ohio. The airport, a privately-owned field which will be operated by Eells Flying Service, is 88 acres in extent and is located one-half mile north of the city. J. F. Elliott, Jr., has been appointed field manager.

**A** LIGHTER-THAN-AIR training school is being conducted at Akron, Ohio, by Akron University acting in cooperation with the Goodyear Tire and Rubber Company. All of the ground school classes are conducted at the University of Akron by a staff of aeronautics instructors who have designed a course to meet the needs of future pilots of both airplanes and dirigibles. Actual flying instruction is given at the Wingfoot Lake air station of the Goodyear Tire and Rubber Co., whose airship operations department sponsors the lighter-than-air training.

Students of the Goodyear lighter-than-air school, under their instructor, Ward T. Van Orman, made 12 flights recently to set a new world's record for the number of training flights made in one balloon with one inflation. The 12 flights were made in an 80,000 cubic foot Goodyear racing balloon, and included night and day training flights and six student solo flights.

After qualifying in piloting the free balloon, the student is given an opportunity to handle the controls of an airship. The Goodyear company has a fleet of these ships, one of which has a capacity of 54,000 cubic feet of helium and is powered with a single motor, while the others have a capacity of 86,000 cubic feet and are powered with two motors.

The courses in the curriculum include aerostatics, aerodynamics, meteorology, practical and theoretical courses on engines, instruments, navigation, free balloon design and construction, non-rigid airship design and construction, airship and balloon operation and maintenance, airship gases, aviation history, Department of Commerce regulations, radio and parachutes.

**R**UBBER air inflated cushions and mattresses, designed for use by airplane passengers and pilots, are being manufactured by the K. & W. Rubber Company of Delaware, Ohio. The cushions and mattresses are vulcanized throughout into one piece and are obtainable in various shapes and sizes for use in airplane cockpits or passenger compartments. They may be inflated with the lungs or a small pump manufactured by the company. A rubber life preserving vest, consisting of two air cushions which may be separated is also made by the K. & W. Rubber Company.

## CLEVELAND

**T**HE new control panel, by means of which all beacons, lights and signals to night fliers at the Cleveland Municipal Airport will be switched on and off, is expected to be in operation soon, according to an announcement of Manager "Jack" Berry. The panel and system were devised by Claude F. King, assistant manager of the field, and represent experimental equipment developed after the study of arrangements elsewhere and the particular requirements of the Cleveland port.

The panel is set up in the octagon-shaped, glass-enclosed tower on top of the administration building. All lights are to be operated by remote control. The panel switches will operate the ceiling and building lights; five signal lights, the illumination of which will tell the incoming pilot the number of other planes in the air at the same time; the floodlights; three-colored lights (green, yellow and red) in the airplane-shaped wind tee; the reserve beacon, cluster beacon and boundary lights. Two ten-foot strips of Neon lighting are being placed on the new and adjacent Austin hangar as part of the equipment.

Operators of the tower will be George Abrams and Harry Brady, working in alternate shifts. The advantages offered by the exceptionally good visibility of the field and sky from the tower, the installation of phones and the easier manipulation of light switches are expected to be reflected in more efficient keeping of the airport log.

**T**HE first unit of a series of five buildings and two cross concrete runways, 1,500 feet long and 150 feet wide, are being built

at Herrick Airport, Richmond Heights, a suburb of Cleveland, and will be completed about the middle of December, according to Louis G. Meister, head of the Curtiss-Wright Flying Service in Ohio.

The first hangar, with inside dimensions of 140 by 100 feet, will have two lean-tos, one of them a two-story structure for office, sales and school rooms. Along the front of the building a concrete apron will be laid. The first building, runways and other preliminary construction will entail an expenditure of about \$100,000.

**EXPANSION** of its activities has required the removal of the Consolidated Air Travel Ticket Office on the mezzanine floor of the Cleveland Automobile Club to ground floor space, M. G. Allen, manager, has announced. The removal is to be made December 10.

The office was established February 15 by the Cleveland Airport Operators Association in conjunction with the auto club to handle tickets and dispense information on airlines operating out of Cleveland. Its staff has grown from three to seven and it is now selling tickets for nearly every line in the country.

**THOMPSON PRODUCTS, INC.**, of Cleveland, Ohio, recently received an order for 20,000 airplane engine valves from Pratt and Whitney Aircraft Company of Hartford, Conn. The order involved a purchase price of \$100,000 and was included in a \$1,000,000 contract for airplane engine parts which has been let to the Thompson company by Pratt and Whitney.

**THOMPSON PRODUCTS, INC.**, of Cleveland and Detroit, has purchased a controlling interest in the S. A. des Etablissements Mecaniques Monopole of France. The Monopole company is located at Poissy, a suburb of Paris, and manufactures engine valves, pistons and piston rings. The Thompson company recently purchased land at St. Catharines, Ontario, where a Canadian Thompson Products plant will be erected.

## COLUMBUS

[W. DONALD WALTER]

### Conference of Intercollegiate Aeronautical Association

**APPROXIMATELY** fifty delegates from various colleges throughout the country attended the three-day session of the Intercollegiate Aeronautical Association at Columbus in November. A feature of the convention was the air derby terminating at Port Columbus. The ships were flown by C. L. Morris of Yale and Donald Bolton of New York University, respectively. Their time was so close, only five minutes intervening between the landing of the two ships, that it was decided to toss a coin to determine the winner. Morris, who won the toss, was presented with a silver cup by the Ohio State Aeronautical Association.

Many problems of the student entering aviation and the operation of flying clubs were discussed at the meeting of college

representatives. A point brought out at the conference was that experiments with gliders offer the most logical means of furthering aviation among college students, both from the standpoint of the limited capital usually available, and because such training is likely to develop more skillful pilots when they do graduate to power flight.

### Reserve Contact Camp at Ft. Hayes

**A** CONTACT camp for reserve officers of all branches of the Army was held at Fort Hayes, Columbus, Ohio, on November 2 and 3. The unusual feature of this camp, and one which illustrates the progressive spirit of the officers in charge of reserve affairs in this corps area, was that the chief events on the program were a visit to Norton Field in the afternoon and a dinner and inspection at Port Columbus immediately afterward.

Through the coöperation of the Army Air Corps and Lieutenant McConnell, commanding officer of Norton Field, representative ships of each of the four branches of military aviation were flown over from Wright Field for the inspection and education of the reserve officers, practically all of whom were from other branches of the service. Observation aviation was represented by the new XO-22, an experimental Wasp-engined job; bombardment by a new Keystone bomber with Conqueror engines; pursuit by the standard P1; and attack by the A3 attack plane. After inspection and demonstration of these ships, lots were drawn, and the officers holding the lucky tickets were given short hops in the field's PT's.

The visit to Port Columbus was at the invitation of Captain Center, superintendent of the Port, and an active reserve officer. Dinner was served in the new municipal hangar. A new Western Electric loud-speaker system, installed for test, was demonstrated, and after dinner there was a very impressive test of the Stillwell Radio Impulse Control, an invention of Mr. W. E. Stillwell, Jr., of Cincinnati. Using this device, lights at the Port were turned on and off by remote control from a ship circling far above the field.

**W. L. EVERITT** of the College of Engineering, Ohio State University, is conducting a series of experiments with a radio altimeter. The work is being carried on under a grant from the Daniel Guggenheim Fund for the Promotion of Aeronau-

tics. The principle involved is that of reflected radio waves from plane to ground. The grant of the Guggenheim Fund was made to further fog-flying safety, as the perfection of such an instrument will be of value in combating the present difficulties of blind flying in fog.

**SURVEY** of a new airway from Columbus to Philadelphia has been commenced by the U. S. Department of Commerce. It is reported that the route will extend from Columbus to Richmond, thence to Philadelphia. Emergency landing fields and airway beacons will be established. The work at the Columbus end of the route is in charge of Grant N. Berryman of the Department of Commerce.

**TRANSCONTINENTAL AIR TRANSPORT** has completed its engine test house at Port Columbus, and is now using it to test all engines overhauled in Columbus. The equipment includes a standard test block, with necessary instruments and controls.

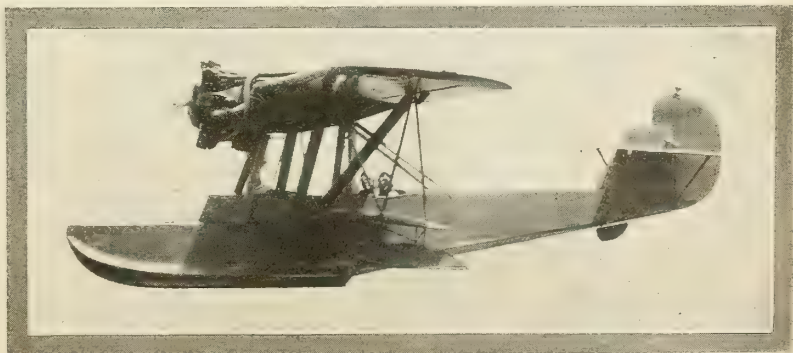
## INDIANA

**CONTRACT** for the construction of a concrete apron at Meacham Field, Indianapolis, Ind., has been awarded by the city council to Colglazier, Hoff and Company, at a cost of \$17,985. The apron will be 1,100 feet by 100 feet and will extend along the front of the row of hangars situated on the field.

The construction of the apron was recommended by City Manager O. E. Carr and is included in a program of general development which has been proposed by Mr. Carr. A new administration building and a hangar are included in the improvement program at Meacham Field, funds for which were provided recently in a voted \$500,000 bond issue for airport development. Construction of these buildings is scheduled to begin during the early part of 1930, and a series of graveled runways extending in eight directions will be constructed at the airport next summer.

**COLUMBUS AIRWAYS, INC.**, has been organized at Columbus, Indiana, to develop an airport east of the city. The com-

(Continued on next page)



The Eastman Flying Boat, manufactured by the Eastman Aircraft Corp., is a four-place plane with a 36-foot wing span



(Indiana News continued)

pany has purchased the landing field. Construction work, including the erection of hangars and the leveling of ground, has been started.

[RUTH NUSSBAUM]

WORK is being started on the first unit of the new airplane factory of the new Corman Aircraft Corporation at Connersville, Ind. The company, owned by the Cord Corporation, plans to build trimotored transport planes. The brick and steel plant, 200 by 400 feet, is to be completed by Feb. 1, 1930.

The Corman company has given a tract of land adjoining its plant to the city of Connersville for the development of a municipal airport. The city council has authorized expenditure of \$50,000 for improvements, as required in the company's offer. Title to the land is to be transferred to the city, leaving management in hands of the Corman company.

THE Kokomo, Ind., city council has appropriated \$4,000 with which to lease Shockley field as a municipal airport. The lease, held by Clyde Shockley, of Shockley Flying Service, has been turned over to the city. Mr. Shockley will continue as manager of the field.

Organization of the Kokomo Flying Club has been effected at Kokomo, Ind. Charter members include Clyde Shockley, Roosevelt Rammell, Gordon Lang, Harold Meadows, Roy Richey, Clarence Wilson, Ralph W. Cutter, W. E. Wyatt, D. K. Russell and Nelson P. Pointer.

PLANS are being worked out by the Indiana Aircraft Trade Association for the second annual Indiana good will air tour next fall. The first annual tour, Sept. 16 to 21, with thirty-four planes visiting twenty-one cities, was voted a success. Next year it is planned to make fewer but longer stops. The number of entries will be limited next year.

THE Portland Flying Service, Inc., Portland, Ind., has been incorporated by Fred Ewry, John Henninger, Fred Foltz, Homer J. McConochy and Roscoe D. Wheat, to engage in aviation in all its branches.

THE Anderson city council has advertised sale of a \$75,000 bond issue to purchase and equip a municipal airport. It is planned to purchase Welch field, owned by the Orin Welch Aircraft Company, at a price of \$40,000. Acquisition of an additional twenty-acre tract is contemplated for the enlargement of the field.

## MICHIGAN

[KARL F. ZEISLER]

THE first anniversary of the Pontiac Municipal Airport was celebrated November 27 at Pontiac, Mich., with the dedication and opening of the Thompson Aeronautical Corporation's new \$110,000 hangar and state administrative offices at the field. On November 27, 1928, Thompson opened the field with the inauguration of air mail service, and in August of this year announced plans for establishing operating headquarters for its Michigan services at the airport.

The new hangar, which includes complete shops, offices and flying school classrooms, was ready for use on the day of its opening. Appropriate ceremonies were held at the dedication, in which the Pontiac Board of Commerce participated.

STOUT AIR SERVICES, INC., Detroit, has inaugurated local passenger service on the Detroit-Chicago lines, making stops at Battle Creek, Kalamazoo and South Bend. One plane a day in each direction is being operated at present. It is planned later to include Ann Arbor and Jackson in the service when local fields are improved sufficiently to make landings safe for the Ford planes used.

DECEMBER 15 will be the opening date of a new passenger flying service between Grand Rapids and Petoskey, Mich., according to a recent announcement of Jack Byrne, president of the Michigan Air Express of Grand Rapids, which will operate the service. Michigan Central trains will make stops at the Grand Rapids Airport to connect with the planes. There will be two planes daily, making the 200-mile trip in two hours.

DESPITE the fact that approaching winter is usually the sign for curtailing aviation activities, the reverse is to be noted

in Michigan, with announcements from many cities of improvement projects now under way or authorized for their landing fields.

Lansing business men have inaugurated a local campaign to improve the present field or secure a new one and develop it into a first class airport. Approval of the lease of the Owosso, Mich., Airport, privately owned, and an appropriation of \$15,000 for its improvement, were actions taken by the Shiawassee County board of supervisors recently. Kent County Supervisors have appropriated \$25,000 for the improvement of the Grand Rapids Airport. Air mail planes have resumed use of the Ann Arbor field following completion of graveled runways, and installation of a 1,000,000-candlepower revolving beacon at the field.

A new hangar is to be erected at the Kalamazoo airport. Coldwater, Manistee and Cheboygan have recently voted funds for the establishment of landing fields. The Department of Commerce reports work practically completed on the erection of 12 new revolving beacons on Michigan airmail routes.

FELIX FARRELL of the Detroit First National Bank, after a recent survey of the aviation industry and of existing production facilities, expressed the opinion that the production of aircraft would be eventually concentrated in Michigan automotive centers. That Michigan will produce the bulk of aircraft, as it produces 85 per cent of the automobiles, is premised on the assumption that airplanes must sooner or later be built on the mass production principle, and that Michigan offers the greatest possibilities of such production.

Mr. Farrell points out that in all fields in which mass production has come to play a leading part, the industry tends to localize in areas where manufacturing advantages are paramount. These advantages for aircraft manufacture already exist in Michigan, according to his diagnosis, as the state has both the trained workers needed for mass production of aircraft, and the flying facilities as represented by over 40 airports.

Michigan's aircraft and motor output in 1928 was valued at \$3,000,000. According to Mr. Farrell, the facilities offered by the state's manufacturing centers are just beginning to be utilized in aircraft production, and when emphasis is shifted to mass production, the automotive centers will be the logical places to concentrate the production of planes and motors.

PRODUCTION schedules of the Driggs Aircraft Corp., Lansing, have been stepped up to meet the increased demand for the new Driggs Skylark, a two-place sport biplane powered by a Rover inverted air-cooled motor, according to Ivan Driggs, president. The new model Skylark is slightly larger than previous models. The four-cylinder Rover motor is manufactured at Lansing by the Michigan Aero Engine Corporation.

A NEW steel and concrete hangar 80 feet square with a 10 by 30 lean-to on each side for supplies, toilets, etc., has been erected at the Ypsilanti Airport by the Knapp Flying Service. A house at the



Lockheed Vega plane recently delivered to the Detroit News for the use of reporters

southwestern end of the field is being re-modeled to include living quarters for six, administration offices, shower baths, club room, and a waiting room for patrons.

Work has already begun on clearing 400 feet at the north end of the field. The U. S. Highway, Route No. 23, a concrete road which will be completed next spring, passes along the east side of the airport. J. G. Schulenburg, formerly with Waco Aircraft and now affiliated with the Knapp Flying Service, at the Ypsilanti field, has designed an exhaust manifold or collector ring for the J-4 and the J-5 Wright engines. Jigs have been set up in the shops at the airport and Schulenburg plans to build a quantity of the rings for distribution.

**FREDERICK C. CRAWFORD**, general manager of the Detroit plant of Thompson Products, Inc., has been appointed first vice president and general manager of the Thompson organization. The need for the position which Mr. Crawford fills was created by the expansion of the company in Canada and France.

**A**N airplane ski which incorporates a small shock absorber to take care of the shock usually absorbed in the inflated tire, has been developed by the Aircraft Products Corporation of Detroit. The absorber is an integral part of the gear by which the skis are attached to the landing gear, and is one of the company's Junior Oilhydraulic models. It has a travel of six inches, and supplements the action of the regular absorber in the landing gear itself.

The ski is made of wood, with removable hickory runners and reinforced with spruce. They are designed to fit on the standard axle of any plane.

**RALPH S. IRWIN**, president of the Aircraft Products Corporation of Detroit, recently announced the entrance of the firm into the pontoon, hull and ski business in a program of general expansion. New and larger quarters, totalling 18,000 square feet, have been obtained with the inauguration of the new division. A. Ralston Stalb, working with J. H. Monzi, chief engineer, heads the new pontoon department.

**T. B. COLBY**, manager of the aviation division of Berry Brothers, Inc., Detroit manufacturer of varnishes, enamels and lacquers, is flying his own airplane on a three months' business trip through Kansas, Nebraska, Arkansas, Oklahoma, Texas and California. He took off at Detroit, October 2 to visit aircraft manufacturers and distributors of aviation finishes in the states named before he returns to Detroit.

**A**N increase of 24 per cent in the enrollment in the engineering college at the University of Michigan this year is attributed to aviation courses being offered there, university officials report. Michigan is one of the few colleges receiving aid from the Guggenheim Fund for the Promotion of Aeronautics.



Frederick H. Becker, left, Eastern distributor, and E. M. Laird, president of E. M. Laird Airplane Company, Chicago, Ill., standing beside a Laird Speedwing J-6-300.

**A**CQUISITION of the Govro-Nelson Company of Detroit by the Ex-Cell-O Aircraft and Tool Corporation has been announced by N. A. Woodsworth, president of the Ex-Cell-O company. The combined companies will manufacture aircraft and Diesel engine parts at Detroit.

[ROLLIN JONATHAN FAIRBANKS]

**T**HE city council of Ann Arbor, Mich., recently made an appropriation to cover the improvements of the runways at the Ann Arbor Municipal Airport and have arranged for the construction of an administration building, to be erected next spring.

Edwin F. Skidopole and James C. Shultz have been added to the staff of pilots of the Flo Flying Services, Inc., operating from the airport. With a 24 per cent increase in the enrollment in the aeronautical division of the college of engineering of the University of Michigan has come an increase in the number of students receiving flying instruction from the local organization.

**A** 16,000-mile air tour was made during October and November by representatives of the Durant Motors, Detroit and Lansing, Mich., in a Curtiss Robin cabin monoplane. The tour was in the nature of a publicity enterprise for Durant Motors and stops were made at over 200 cities throughout the country.

#### Brock and Schlee Receive Medal

**T**HE Harmon Medaille d'Honneur has been awarded to Edward F. Schlee and William B. Brock by the International League of Aviators in recognition of their long distance flight in 1927. The Medaille d'Honneur is awarded annually to pilots whose contribution to aviation is considered worthy of international acclaim.

Brock and Schlee flew a Stinson-Detroiter monoplane 12,295 miles in 18 days, or 145 hours of actual flying time, in an attempted flight around the world.

**T**HE Department of Commerce has granted an Approved Type Certificate for the Continental A-70 aircraft engine, manufactured by the Continental Aircraft Engine Company. The Continental A-70 engine was rated at 165 horsepower at 2,000 revolutions per minute as the result of the tests conducted by the Bureau of Standards.

#### Curtiss Flying School at Grosse Ile Airport, Grosse Ile, Michigan

**A**SCHOOL has been established by Curtiss Flying Service at Grosse Ile Airport, Grosse Ile, Mich., for the purpose of developing licensed pilots into Curtiss flying instructors. The instructors' school is operated in conjunction with a flying students' school which was licensed by the Department of Commerce on August 20, 1929, to give ground and flying courses leading to private and limited commercial pilots' licenses. The Department of Commerce also approved the Curtiss Flying Service at Grosse Ile on October 9, 1929, to give ground and flying training leading to the transport pilot's license.

The ground and flying courses, which are standard in all schools operated by the Curtiss Flying Service, are supervised at the Grosse Ile headquarters and have been approved by C. S. "Casey" Jones, organizer and president of Curtiss Flying Service.

The private course includes ten hours of dual instruction in taxiing, turns, landings and take-offs, and ten hours of solo flying. The solo work is checked at intervals and includes at least one cross-country flight before the student completes the course. The ground school instruction consists of twenty-four lectures, covering such subjects as theory of flight, instruction in airplanes and engines, meteorology, aerodynamics and air commerce regulations. Training hours may be arranged to accommodate students who desire to work while training.

Instruction in the limited commercial courses includes fifty hours of flying and parallels ground and flying instruction given in the private course in addition to more advanced instruction. The limited commercial course includes flying instruction in steep turns, spirals, figure eights, cross-wind and side slip landings, and acrobatics. Cross-country instruction is given in both open and cabin planes and trips to cities as much as two hundred miles distant are made. On these cross-country flights the student pilots the plane, checking the course with instruments and maps.

The transport pilot's course includes two hundred hours of dual and solo instruction and includes the curriculum given in the limited commercial course in addition to more advanced phases of flying, including ten

(Continued on next page)



(Michigan News continued)

hours of night flying and additional ground school work.

In addition to the Curtiss Fledgling, other approved standardized open-cockpit and cabin planes are used in the course of instruction given by Curtiss Flying Service.

A seaplane pilot's course is also given by Curtiss Flying Service in addition to the standardized landplane courses. Instruction includes the private ground school course of twenty-four lectures and twenty hours of dual and solo work. The Ireland amphibion and the twin-engined Sikorsky amphibion are used in all Curtiss seaplane training courses which are given only at the Curtiss schools established near a seaplane base.

## MISSOURI

**N**ET profits of \$87,828.91 for the first six months of 1929 have been announced by the Nicholas-Beazley Airplane Co., Inc., of Marshall, Mo. The expenses of building the factory and installing the necessary equipment for production of the Barling NB-3 monoplane has been completely charged off in this statement.

This year has marked considerable expansion on the part of the Nicholas-Beazley company with the expansion of facilities at the plant in Marshall and at the airport owned by the company three miles from the city. A Western Branch of the company has been established at Los Angeles for the distribution of Nicholas-Beazley parts and supplies. The branch has been showing a steady increase and for the month of October showed a net profit in excess of \$2,000.

**N**EGOTIATIONS for the distribution in Canada of Nicholas-Beazley parts and supplies and the Barling NB-3 monoplane have been completed with the Aeronautical Corporation of Canada, Ltd., recently organized at Winnipeg, according to W. F. Potter, export manager of the Nicholas-Beazley Airplane Co., Inc., of Marshall, Mo., manufacturers of the Barling plane. A contract calling for twenty planes was placed by the Canadian concern, which has recently accepted delivery on the first two ships.

The Aeronautical Corporation of Canada was recently organized for the distribution of aircraft and aircraft supplies in Canada. J. A. Sully, president of the Winnipeg Flying Club, is president of the company. C. O. Borker, formerly purchasing agent for the Canadian Western Air Express, is the purchasing agent. According to officials of the new organization, branches will be established in the near future which will be located so as to offer immediate parts and supplies service to Canadian airlines and other operators.

## KANSAS CITY

[H. H. JAMES]

**U**NITED STATES AIRWAYS, INC., operating between Kansas City and Denver, has recently appointed three Kansas City men to positions in the company. J. M. Knappenberger has been made general traffic manager of the company, George Halsey, manager of operations, and F. C. Wahlenmaier, division manager in Denver.

**T**HE Bredouw-Hilliard Aeromotive Corporation has moved into a new combination service and supply building at the Kansas City Municipal Airport. The company is the mid-western distributor for the Wright Aeronautical Corporation and also operates a general airplane supply business at the airport. The building is of modern brick construction, 140 by 120 feet, and houses the service and supply activities. The new hangar together with another hangar gives the Bredouw-Hilliard Aeromotive Corporation 26,000 square feet of space.

**M**ACY McKEE, sixteen-year-old flying student enrolled in the Kansas City Universal Flying School, Fairfax Airport, Kansas City, is one of the youngest student pilots in America. He has more than sixty hours of solo flying to his credit and his age is all that prevents him from qualifying for an industrial or limited commercial pilot's license, according to instructors at the Universal school. He must wait until he is eighteen years old before he will be eligible for a flying license.



Macy McKee, 16-year-old pilot, who has 60 hours solo to his credit

## ST. LOUIS

[A. W. LEAGUE]

**P**LANES from the St. Louis Municipal Airport, Parks Airport and a blimp from Scott Field took part in the recent dedication of the new beacon in North St. Louis. The beacon, which is of 8,000,000 candlepower, is mounted on an abandoned water tower 157 feet high. The beacon throws a beam visible from twenty-five to fifty miles, depending on the weather conditions. Besides the revolving beacon there are two stationary directional beacons—one pointing to the St. Louis Municipal Airport and one to the Parks Airport.

### Construction Hastened at Curtiss-Steinberg Airport

**T**HE steel structure of the first hangar at the new \$3,000,000 Curtiss-Steinberg Airport, two miles south of East St. Louis, is being put in place, and it is expected that

a flying school will be in operation by Jan. 1. The first hangar, 120 feet by 100 feet, will be followed immediately by two others. Future plans call for eight such structures along the west side of the field, four on either side of an administration building housing the headquarters of the Curtiss-Wright Flying Service in St. Louis and the Trans-Continental Air Transport, Inc., which will share the field. The administration building and air terminal will be available to other transport lines. The hangars will have buff brick exteriors with large expanses of glass to admit light. The interiors will be finished with glazed tile.

Although runways have not been started, the field is available for ordinary flying purposes. Approximately 50 miles of tile was laid and the necessary grading of the 510-acre tract was completed during the summer. Four miles of hard-surfaced roads are under construction, and a complete lighting system for night landings will be installed before flying operations start. Three runways, with either concrete or asphalt surface, will be constructed. The longest, 4,900 feet long, will cross the field diagonally from southwest to northeast which is the direction of the prevailing wind. The second, 3,600 feet long, will be along the north side of the airport. The third will intersect the first strip and will be 3,600 feet long, the three strips giving landing and take-off options in six different directions. A concrete apron will mark the western boundary of the landing area and will be used as a loading and unloading area for transport planes.

Bids on two sections of the runways, each 1,600 feet long and 100 feet wide, have been advertised for, and the strips will be laid before the cold weather sets in. The other lengths will be constructed next spring.

The construction schedule calls for completion of the first three hangars by January 1. The next structures started will be a students' dormitory, a school building and an overhaul shop. The school building and dormitory, accommodating 100 students, will occupy an area behind the hangar line, with a second dormitory, faculty apartment and cafeteria building to be added. The overhaul shop will be equipped with electrically driven machinery and will provide complete facilities for the repair of both engines and planes, including a dope and wing-covering department.

The administration building, with a three-story center section and two-story wings, will also be started this winter. The structure will be 177 feet by 100 feet in area. In addition to containing the general offices of the Transcontinental Air Transport, Inc., and the local branch of the Curtiss-Wright Flying Service, the structure will contain a restaurant, a main lobby for passengers, ticket offices, weather bureau, post-office, express office and the office of the airport manager. There will be an observatory tower on the roof and a terrace in front overlooking the airport. The exterior of the structure will be terra cotta. Future plans call for an airplane exhibition building where models of all planes sold by Curtiss-Wright Flying Service will be on display. This building, 300 feet by 200 feet, will be near the main entrance to the field.



(Missouri News continued)

**T**HE new Von Hoffmann Service Hangar has been officially opened for business. The new hangar will provide space and service for private plane owners. Commercial and transient planes will also be serviced and repaired. The new hangar is of brick and steel construction, and is large enough to house several trimotored planes. The Von Hoffmann Company handles the service at the St. Louis Municipal Airport for the Safeway Airline planes operating between St. Louis and Dallas, Texas, and will use this hangar to house the Ford planes operating on this passenger line.

**B.** D. ADAMS, formerly in charge of sales of the Ryan Aircraft Corporation, has been appointed assistant general sales manager of the Detroit Aircraft Corporation. Mr. Adams will have charge of planning a co-ordinated sales policy for the entire group of eleven subsidiaries of the Detroit Aircraft Corporation. He will also have charge of all advertising, and the designing of the interiors of the different makes of planes manufactured by the subsidiaries of the Detroit Company.

**WILLIAM "BILL" BREWSTER**, formerly of the Royal Flying Corps, and one of the first aviation instructors in St. Louis, has been appointed chief pilot for the Von Hoffmann Flying School. He succeeds James Malone, who has been assigned to the sales department of the Von Hoffmann organization.

The second dormitory of the Von Hoffmann Flying School has been opened at the St. Louis Municipal Airport. Like the original building completed some time ago, the new structure is of the low adobe type of architecture. Hardwood floors, modern plumbing and heating plants are available, and a special ventilating system has been installed. The dormitories are finished in Nile green and ivory. A spacious study hall and recreation room is accessible from each dormitory through a covered runway.

**PARKS AIR COLLEGE**, located south of East St. Louis, has been approved by the United States Department of Labor as a flight-training school for foreigners. According to the privileges of such approval, foreign students intending to take training at Parks Air College will be permitted to enter the country for that purpose regardless of immigration quotas. Foreigners in the flying school have ranged in numbers from twelve to thirty since the school was opened two years ago. A total of seven foreign countries is represented by ten foreigners now attending its classes.

**A** NEW company, the National Air Boat Express, Incorporated, has been formed for utilizing the Mississippi River and other rivers as airways with St. Louis as the center of the company's activities. For landing fields this company will use rivers in the Mississippi Valley. Amphibion planes will carry on the passenger service extending up the Mississippi River to Minneapolis and

south to New Orleans, up the Ohio River to Pittsburgh, up the Illinois River to Chicago, and up the Missouri River to Kansas City.

**T**HE Lambert Field Flying Club has been incorporated and has purchased a Travel Air for the use of members of the club. Permanent officers have been elected and the club is now in full operation.

**T**HE International Class A Aircraft Show will be held at St. Louis, Mo., February 15 to 23 inclusive, 1930, sponsored by the Aeronautical Chamber of Commerce of America, Inc. The exposition will be held in the St. Louis exposition buildings adjacent to a landing field to enable planes to land and be taken into the building for exhibition without the necessity of disassembly.

#### New Practices Announced by Parks Air College

**U**NDER a plan adopted by Parks Air College, Inc., of East St. Louis, the ownership of a new Travel Air or Parks P-1 biplane is included in the tuition fee for the Parks transport pilot course. The plan is intended to effect a saving to the student desiring to own his plane and obtain a transport pilot's license. While the cost of the course is higher than the tuition charged for the regular transport course which does not include the ownership of a plane, it is less than the combined cost of the regular transport course and a Travel Air Parks P-1 plane.

(Continued on next page)

## "PRE-HEAT WITH THERMO-PETE"

**B**Y using a Thermo-Pete you will find that you can cut down useless revolutions of your engine—getting the same results.

The cost of operating Thermo-Pete for twenty minutes is **ONE CENT**—How much does it cost you to operate your engine for twenty minutes

"Thermo-Pete" (best friend to motor and pilot) when connected with the ordinary 110-volt lighting circuit, quietly, quickly and inexpensively heats the oil (without injury) to the desired take-off temperature, ready for "Contact" and "Twist the Stick" and "She's Away!"

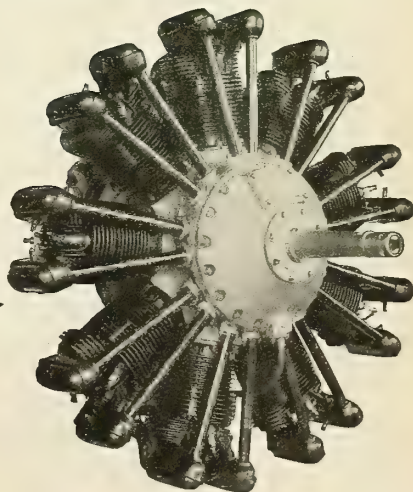
Approved by National Board of Fire Underwriters and many other authorities, "Thermo-Pete" is today's scientific answer to the need for saving Dollars, Pilot's Time, Motor Depreciation, Schedule Hours and Hangar Labor.

Use coupon and let us airmail you complete details of the help "Thermo-Pete" will be to the motor of YOUR ship.

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I am flying a ..... ship  
with ..... motor,  
whose oil tank is made of .....  
holds ..... gals, and is shaped like the  
rough sketch I've drawn in the margin.  
Tell me more about "Thermo-Pete." (A D 12-29)  
Name .....  
Street .....  
City ..... State .....

And at a Glance You Can See the  
Tremendous Saving in Operating  
for the Warming Up Period

It has been proved that THERMO-PETE has saved  
operators from \$20.00 to \$300.00 per month



(Missouri News continued)

Purchasers of airplanes manufactured by Parks Air College, have the choice of one of several color combinations, under a plan recently adopted by the company. Among the color combinations available to purchasers of Parks planes are, orange wings with the fuselage painted either in dark green, maroon, light green, brown, red, dark blue or tan. Other combinations include tan fuselage with cream wings, and blue, green and maroon fuselage with silver wings. The color option is available to purchasers of the Parks P-2, a sport biplane with an air-cooled engine, and the P-1, a biplane powered with an OX-5 engine.

ORGANIZATION of the field sales force of the manufacturing division of Parks Air College, Inc., of East St. Louis, has been completed by Ray W. Brown, general sales manager. A three-day course in airplane sales methods was given during the work of organizing the new sales force, with Mr. Brown in charge of the sessions. The new Parks salesmen are: John W. Williams, W. A. Hansley and G. H. Hutson.

A. E. McMANUS, JR., has been appointed assistant to Edwin B. Meissner, president of the St. Louis Aircraft Corporation. Mr. McManus served with the Royal Air Force during the war and was formerly general manager of the Culver City Airport Corporation of California.

APPROVED Type Certificates have been issued for the Standard Senior and Super Cardinal planes manufactured by the St. Louis Aircraft Corporation of St. Louis, Mo.

A HOME study course in pilot's ground school training has been organized by Universal Aviation Schools. The course includes aerodynamics, engines, navigation,

meteorology, photography, aviation business, aviation history, insurance and law, air commerce regulations, sales and finance. The course is designed as preparatory study to shop training.

## LOUISIANA

[C. F. Cook]

ESTABLISHMENT of emergency landing fields along the highways and air routes of Louisiana is planned by a sub-committee of the Louisiana Chamber of Commerce aviation committee which met in Shreveport November 8. The committee appointed by Chairman Oliver consists of Clarence Kellam, of Alexandria; Harry P. Williams, of Patterson, and Thomas H. Taylor, of New Orleans.

THE establishment of a station for air weather reports in Shreveport, as soon as aviation activity in this section justifies it, has been recommended to the Department of Agriculture by J. W. Cronk, Meteorologist of the U. S. Weather Bureau at Shreveport. Mr. Cronk supplies weather reports now to aviation concerns and fliers through the local bureau.

A JOINT ticket office has been established at the Washington-Youree Hotel in Shreveport by the Delta Air Service, Inc., of Monroe, La., and the Weddell-Williams Air Lines, of New Orleans.

EQUIPMENT for the municipal airport which is being established at Natchitoches, La., will be purchased soon, it was announced recently with the closing of the contract for the 207-acre tract of land. The equipment will cost about \$15,000 and will consist of hangars, lighting facilities, and other airport necessities. A bond issue of \$35,000 was voted to finance the airport, the tract of land costing \$21,000.

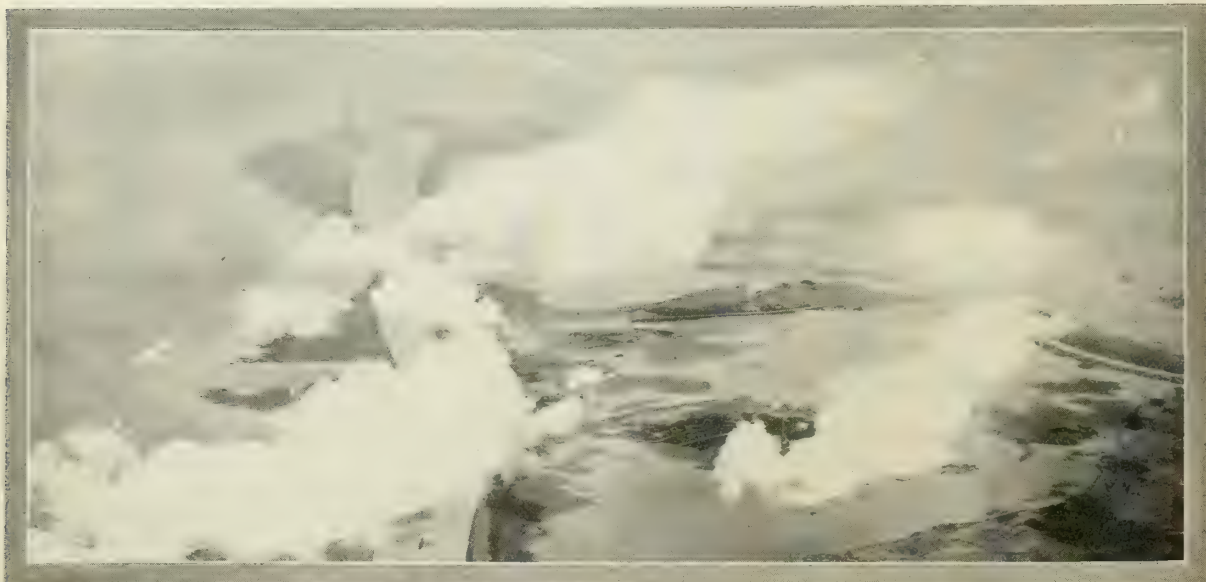
THE membership in the Shreveport organization known as "Skyclimbers" has reached nearly 700 since its organization six months ago. Aaron Selber is head of the organization and the members consist of youths who are interested in the development of aviation. The Skyclimbers were given a special day in their honor at the Louisiana State Fair this year.

THE Louisiana Aeronautical Society has been formed to foster aviation in Louisiana with a membership of more than 1,200 business and professional men. Headquarters have been established at New Orleans and branches have been formed in every county of Louisiana.

One of the principal objects of the society is to foster air-mindedness on the part of the general public. Among the initial activities sponsored by the society is an educational program. I. B. Tribken is president of the Louisiana Aeronautical Society and Gilbert J. Fortier is chairman of the board of governors.

THE firm of Jones, Roessle, Olschner and Weiner, of Shreveport, New Orleans, and Baton Rouge, has been selected as architects for the East Baton Rouge Parish Airport at Baton Rouge, according to a recent announcement of the Baton Rouge aviation commission. The airport will cost \$150,000, the funds having been made available through a bond issue voted August 20. A. G. Seifried and Company has been selected as engineers for the project. The airport will be situated on a 200-acre tract and will have a hangar, machine shops, ground quarters, offices and rest rooms.

THE Great Southern Airways, of Delaware, is expected to extend an air transport line through Shreveport in its transcontinental route from Los Angeles to New York. The route will be through Dallas and  
(Continued on next page)



Aerial photograph of the Southwest Pass, Mississippi River delta, made by the Airmap Corporation of America

## COMPANION PLANE TO THE VIKING FLYING BOAT



# THE KITTYHAWK

First and foremost built for safe flying

To gain superiority in either speed or performance a plane must sacrifice safe flying qualities. The Kittyhawk has not attempted to develop those features at the expense of its general all-round characteristics for safe flying . . . it will travel at 110 miles per hour . . . it will out-perform most planes in its class . . . but first and foremost the Kittyhawk is built for safe flying.

With a landing speed of 38 miles per hour . . . with a wheel tread of seven feet two inches . . . the Kittyhawk is particularly adept at getting in and out of small rough fields . . . a factor which enables even the inexperienced pilot to land under unfavorable conditions . . . with a greater degree of safety.

## SPECIFICATIONS

Kittyhawk Model B-4

Engine—Kinner K-5 100 H.P.  
Approved Type Certificate  
No. 166

Length overall	22 ft. 11 in.
Height overall	8 ft. 8 in.
Span both wings	28 ft.
Chord both wings	4 ft.
Wing area	233.4 sq. ft.
Weight empty	1107 lbs.
Useful load	768 lbs.
High speed	110 m. p. h.
Cruising Speed	90 m. p. h.
Landing speed	38 m. p. h.
Climb	1200 ft. p. m.

THE VIKING FLYING BOAT COMPANY

89 Shelton Avenue, New Haven, Conn.

Miami Hangar — The Viking Flying Boat Company (Florida) Inc.



(Louisiana News continued)

Atlanta, Ga. Plans for this extension were recently announced by C. M. Hatch, of Pasadena, Calif., president, who made a preliminary tour of the proposed line. One plane daily will be used at first in the service. Eight-place monoplanes will be utilized.

THE City of Natchitoches recently purchased a tract of 160 acres, three quarters of a mile from the city and east of the State Normal School campus, for its municipal airport. The City Commission has plans under consideration for putting the field in condition. The field is to be enlarged later with the purchase of additional land.

[HAROLD A. DEMPSEY]

SHREVEPORT, Louisiana, and New Orleans will be connected by a daily airplane service in the near future, according to the announcement of the Wedell-Williams Air Service. The following schedule will be put in force: Leave New Orleans at 8:30 a. m., arrive in Alexandria at 10:45 a. m., arrive in Shreveport at 12 noon. Leave Shreveport at 2 p. m., arrive at Alexandria at 3:15 and at New Orleans at 5:30.

THE S.A.T. Flying Service located in St. Bernard Parish and New Orleans is completing its expansion program. The program includes a new administration building containing quarters for a post office that will handle details of the air mail. This post office was commissioned during the past month. An airplane hangar 203 feet long by 162 feet deep, with provision for an extension of 91 feet in length and 162 feet in depth, is being erected at the field.

THE aviation committee of the Louisiana Chamber of Commerce met during the past month in Baton Rouge. The meeting was of statewide significance as initial steps were made in the furtherance of aviation in the state. Officers were elected, preliminaries conducted towards the adoption of an air code for Louisiana, and a system of marking communities and highways was considered at the meeting. It is the plan of the committee to compile data on the erection of airports for cities contemplating such projects.

Travis Oliver of Monroe, president of the Delta Air Service, was named chairman of the committee, T. H. Taylor of New Orleans, vice-chairman, and James T. Amis of Baton Rouge, secretary. Others attending as members of the committee were: James C. Menefee, Allen S. Hackett, Harry P. Williams, J. R. Wedell, John D. Ewing, John L. Henning, Clarence Kellam, and Herbert Bayliss.

VIC GRIMA of New Orleans, former traffic manager for the St. Tammany-Gulf Coast Airways, has been named general traffic superintendent for the entire Southern Air Transport System. The announcement was made by T. A. T. Flying service, a subsidiary of the system. He succeeds Robert J. Smith who goes to New York as general traffic manager for the system.

## TEXAS

AN office building will be erected at Fort Worth, Texas, to house the general offices of the Southern Air Transport System, the second largest subsidiary of the Aviation Corporation. The Aviation Building, as it will be called, is to be erected under the direction of A. P. Barrett, president of the Southern Air Transport System and vice-president of the Aviation Corporation. It will be 275 feet high, and the equivalent of a 24-story building. In addition to twenty stories to be used by stores and offices, there will be four windowed attics. The building will be primarily a tower 50 feet square, but-tressed on the east and west by subordinate structures set back on the front and side.



Silliman Evans, director of publicity for Southern Air Transport

SILLIMAN EVANS, director of public relations for the Southern Air Transport unit of Aviation Corporation, is a former newspaper man. He has had fifteen years' experience in newspaper work and also served a term in the diplomatic service in Copenhagen.

THE name of T.A.T. Flying Service, Inc., a division of the Southern Air Transport, Inc., has been changed to S.A.T. Flying Service, Inc. The initials T.A.T., formerly denoting the T.A.T. Flying Service, Inc., are now S.A.T. Extension of flying service into many southern states other than Texas was given as the reason for the change. Southern Air Transport, Inc., is a division of the Aviation Corporation.

SCHEDULES of east and westbound planes of the Fort Worth-El Paso line of Southern Air Transport, Inc., have been changed in order to provide connections with planes of the Braniff Air Lines, flying from Fort Worth to Tulsa, Okla.

Westbound planes of S. A. T. will leave Fort Worth at 12:25 p.m., instead of 11 a.m. This will enable passengers arriving at Fort Worth at 11:50 a.m. on the Braniff Air Lines to enplane for El Paso and arrive there at 5:15 p.m. On the eastbound schedule,

S. A. T. planes will leave El Paso at 6:30 a.m., and arrive at Fort Worth at 1:30 p.m., enabling passengers to take the northbound Braniff plane at 1:45 p.m., and arrive at Tulsa at 6 p.m.

## SAN ANTONIO

[MABEL COOPER]

OF interest to tourists of San Antonio and vicinity is the recent announcement that planes may enter Mexico and fly into the interior as far as Monterey, Saltillo, Torreon, and Tampico by obtaining permits from Laredo. Previously it was necessary to obtain permits from the City of Mexico, often causing much delay. By applying at the office of the Laredo Chamber of Commerce and properly identifying themselves as bona fide tourists, proving ownership of plane or authority to fly it, applicants are granted permission to enter the Republic for a period of ten days.

WITH international airmail service between Mexico City and Laredo, Texas, to be established January 1, 1930, it is believed that airmail service from San Antonio to Laredo to connect with the Mexican airmail will be re-established. On the Laredo-Mexico City service trimotor planes will be used. Application is now being made to have Laredo designated as an International Airport.

CONTRACT for construction of the first unit of Randolph Field was awarded recently to the Murch Brothers Construction Company of St. Louis, Mo., which agreed to build six barracks and two warehouses for \$1,227,000. The company agreed to complete construction within 420 calendar days.

WORK on the new Curtiss Flying School to be established on a 300-acre tract of land north of Hensley Field is now under way, and is being supervised by Capt. W. F. Long, director of the school. Plans for the \$100,000 hangar and administration building are completed and the school will be in operation shortly. Stone & Webster has the contract for erection of the hangar and administration building.

The new field will be called Noyes Field, in honor of Major Joseph Noyes. Dedication of the field, which was purchased by the Curtiss Flying Service, is planned with a three day celebration.

THE Garland-Lord Aircraft Sales Company of San Antonio has been appointed distributor for the Stearman Aircraft Corporation of Wichita, Kan. The officers of the sales company are: Bob Garland, president, and Fred Lord, vice president and general manager.

## FT. WORTH

[CAPT. W. H. SCOTT]

THE City Council of Fort Worth, Texas, has awarded a contract for the construction of a concrete apron in front of the hangars at the Municipal Airport to Colglazier, Hoff and Company, which submitted

(Continued on next page)

# "YOUR FUTURE DEPENDS upon *WHERE* you are trained



Do you realize what a vast difference there is among flying schools? Differences in methods, courses, instructors, equipment?

Parks training gives you a *tremendous advantage* over the man trained at the ordinary flying school. At Parks you get full benefit of the methods and facilities which have made Parks the *nation's outstanding air school*. You are given a complete, conscientious ground course. You are taught to fly first in planes of moderate power, next in higher powered ships, and finally in cabin and transport planes. *A fleet of 30 modern ships is here for only one purpose—your training!*

The large staff of Parks instructors is composed of men with proved records of character, experience and ability. Every one is a highly skilled expert, recognized and licensed by the United States Government.

Parks facilities for your comfort, as well as your education, are unequalled. Large, modern dormitories with capacity for 300 students—recreation rooms—good food—a wonderful location, 20 minutes from St. Louis—all help make your stay at Parks a very delightful one.



*Instructor Making Entry in Student's Log Book*

Parks Air College was among the first schools to be approved and licensed by the Department of Commerce. It qualified without a moment's preparation. This is a tribute to the thoroughness and sincerity of Parks methods. Mr. Parks will tolerate no half-way methods—he insists upon the very best for every student. No wonder Parks graduates are in great demand everywhere—no wonder a diploma from Parks gives you prestige you could not expect otherwise.

In spite of all the many extra advantages that Parks offers you, a course here costs you no more than you would pay at schools with far less equipment, less thoroughness, less reputation. *Don't be deceived* into thinking that the *best* costs more than the second or third best.

You can't afford to "take a chance." Your whole future is at stake. Decide now that nothing but Parks training is good enough for you.

The coupon will bring you illustrated catalog and full information.

## PARKS AIR COLLEGE

(Division of Detroit Aircraft Corporation)

Room 1266 634 North Grand Avenue

ST. LOUIS  MISSOURI

### » » » COUPON « « «

PARKS AIR COLLEGE, Room 1266  
634 North Grand Avenue, St. Louis, Missouri

Without cost or obligation to me,  
please mail your illustrated catalog.

Name

Street address

City  State



(Texas News continued)

a bid of \$16,985.

The apron will be of reinforced concrete, 1,100 feet by 100 feet. It is the first of a number of improvements which will be made at the Municipal Airport through the sale on November 20 of \$150,000 of the \$500,000 in bonds which has been voted for airport improvements and the purchase of additional land for the field.

THE airport at Midland, Texas, has been designated an Army Air Corps station point, and the Government will establish at Midland a radio station for receiving and broadcasting weather data, a meteorological station, and a hangar. Four members of the Army Air Corps will be stationed at Midland. Harvy Sloan, manager of the field, has announced completion of plans for the construction of buildings and barracks to house the Government apparatus and personnel. Night illumination will also be provided.

Midland field is near the geographical center of airlines from Fort Sill, Fort Bliss, Fort Sam Houston, Kelly Field and Love Field, and is used as a training field for Army Air Corps cadets making cross country flights.

AN air meet was held at the airport at Ranger, Texas, on Armistice Day, November 11, in commemoration of the first anniversary of the airport. Included in the contests held during the air meet were dead stick landings, acrobatics, parachute jumps, balloon bursting and a free for all speed race. More than fifty pilots and planes were entered in the various events.

## DALLAS

[RUBY THOMPSON]

THE CROMWELL AIR LINES, INC., which opened service between San Angelo and Dallas recently, has announced a twice-daily service each way on its line. Carl Cromwell is president of the company. Westward-bound the planes leave Dallas at 8:00 a. m. and 3:00 p. m.; leave Fort Worth 8:25 a. m. and 3:25 p. m.; and arrive at San Angelo 10:25 a. m. and 5:25 p. m. On the eastward trip planes leave San Angelo at 8:00 a. m. and 3:00 p. m.; leave Fort Worth at 10:00 a. m. and 5:00 p. m.; and arrive in Dallas at 10:25 a. m. and 5:25 p. m. Eight-place Stinson cabin type planes powered with Wasp 525-horsepower engines are used on this route. D. D. Myers, traffic manager, has Dallas offices in Hangar No. 1 at Love Field.

A CENTRAL aviation news bureau was opened at Love Field Airport on November 15th, with B. F. Riddle as director of publicity. Mr. Riddle will cover the airport for the four Dallas papers. All improvements and activities on the airport will be reported promptly on receipt of their announcement by the different passenger and mail operating companies.

Until completion of the bureau's new offices temporary offices will be maintained at headquarters of the 366 Observation Flying Squadron.



Ten-million candlepower beacon and tower erected on Mt. Franklin near El Paso by the Pasotex Petroleum Co.

A TEN MILLION candlepower beacon on Mt. Franklin, El Paso, Texas, on a tower 54 feet high was erected and is maintained by the Pasotex Petroleum Company of El Paso. On the platform below it a three million candlepower direction beacon points to the El Paso airport. The letters "P-E" have been designated by the Department of Commerce and stand for "Pasotex—El Paso."

The Pasotex Co. is now entering a program which will be of great value to pilots flying over the southwestern route. Emergency landing fields are being built over the "Pasotex pipeline cut-off." Three of these landing fields are located at Pasotex pumping stations, and one is north of their Hueco pumping station west of the Guadalupe Mountains. The field is placed in that locality as the Guadalupe mountain range gives pilots and passengers a great deal of concern at times. This program of building the emergency landing fields has been entered into by the company for the purpose of insuring greater safety and convenience to pilots and passengers over this route. The "Pasotex pipeline cut-off" can better be appreciated when it is realized that approximately 150 miles of travel is cut from the distance between El Paso and Midland.

The company has already received a great deal of favorable comment from various transportation companies and pilots as well as from passengers on their progressive activities in West Texas.

## OKLAHOMA

HARVEY P. EVEREST, distributor of AERO DIGEST and wholesale periodical dealer of Oklahoma City, Okla., has purchased a new Ryan Brougham from the Detroit Aircraft Corporation of Alglum, Mo.

Mr. Everest will use the plane in making contacts with retail dealers throughout the state, and for transporting rush orders.

APPOINTMENTS of distributors for Spartan planes were announced recently by officials of the Spartan Aircraft Company of Tulsa, Okla. Five Spartan planes were contracted for by A. E. Rohde, of the Rohde Motor Company, Tucumacri, New Mexico, distributor in New Mexico and Arizona. Ten planes were ordered by B. J. Wickham of Council Bluffs, Iowa, who will be Spartan distributor for Western Iowa and Eastern Nebraska. F. C. Adams of the Adams Aircraft Company, newly appointed distributor for Sapulpa, Okla., contracted for five planes.

THE Spartan Aircraft Company of Tulsa, Oklahoma, has announced the following additions to the personnel of the engineering department: J. F. Cox, formerly planning manager of the Parks Aircraft Company, in charge of materials; Albert Brown, formerly engineer for Command-Aire, Inc., draftsman, and Alva Freeman, formerly draftsman for the Sullivan Aircraft Company, draftsman.

### Spartan School of Aeronautics at the Municipal Airport, Tulsa, Oklahoma

FLYING and ground students enrolled in the Spartan School of Aeronautics at Tulsa, Okla., are given access to the various departments of the Spartan Aircraft Company factory for the study of airplanes, aircraft engines and production methods. The school is located at the Municipal Airport, and is half a mile from the Spartan plant. The Department of Commerce approved the Spartan School of Aeronautics on October 18, 1929, to give ground and flying courses leading to private, limited commercial and transport pilots' licenses.

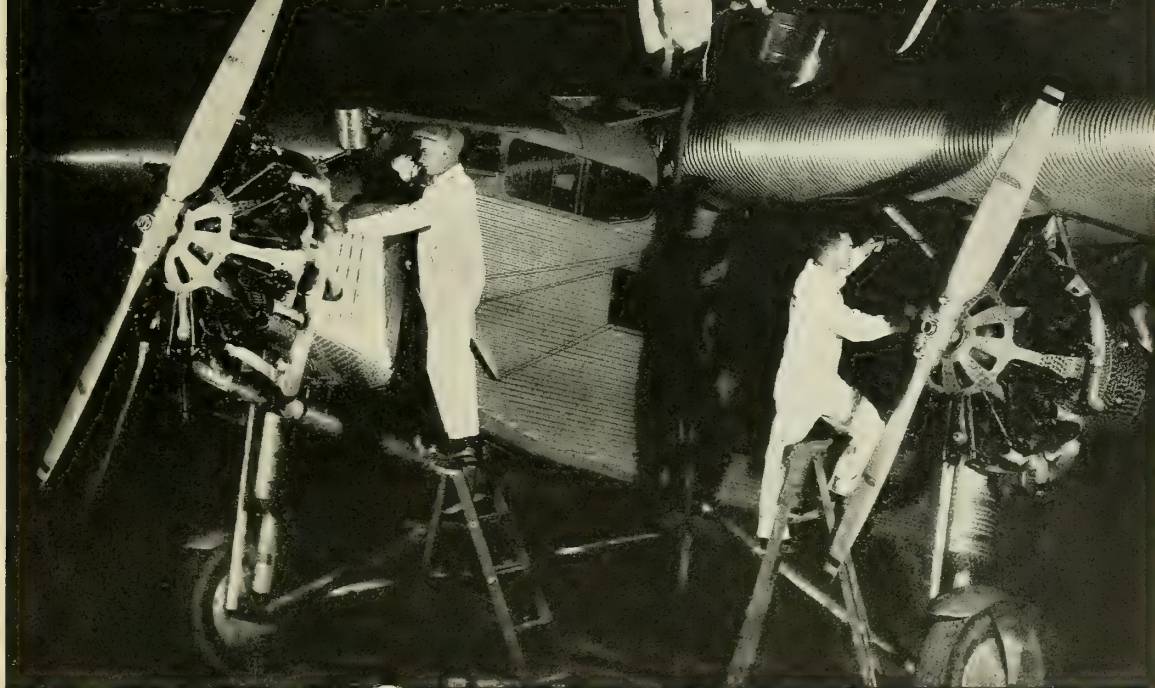
The Municipal Airport at Tulsa includes 405 acres of land located at the corner of two paved highways, and it is readily accessible to the business district of Tulsa. There are all-weather runways in all directions and the shortest of these is 3,500 feet in length.

The Spartan School of Aeronautics has established buildings for the exclusive use of students at one corner of the field on the state highway. These include a dormitory which is provided with a lounging and recreation room, a building housing executive offices and lecture room, a building housing a laboratory and a garage. There is also an airport restaurant.

The private course includes twenty hours of flying, ten hours dual and ten hours solo, with instruction in the ground school. The limited commercial course includes the entire curriculum of the private course with the addition of five hours more dual instruction and forty hours additional solo training, which aggregates fifteen hours dual and fifty hours solo. The transport course covers 200 hours of dual and solo flying and may be taken in units of ten hours. Ground school

(Continued on next page)

# SKELLY PRODUCTS... *Everywhere*



AT every point where petroleum protects or fuels this trimotored Ford of the S. A. F. E. transport line, dependable Skelly Aviation Products are used. A good aircraft engine deserves the best, and that holds true for school, military, private plane and racing craft as well as for transport duty. All Skelly products are made to the Skelly Standard: "Quality has no substitute."

Aviation Sales Department  
SKELLY OIL COMPANY  
Tulsa, Oklahoma



## Improved . . . . Air Tested . . .

Have you noticed the difference in the new Skelly Aerodynamic Gasoline? Three months ago new special equipment was installed to make it. A good product before, it's even better now. Zippy acceleration. High power content. Low in weight. No sign of a knock. Complete combustion. Skelly jobbers and Skelly branches at better airports can supply you.

Before we announced the improved Skelly Airplane Oil, it met severe tests in racing, transport, military, school and private planes. Only when authorities said no better oil could be made was this perfected lubricant offered for your use. Race with it, climb with it, fight the wind with it, Skelly Airplane Oil is MADE TO STAND ABUSE.

**SKELLY  
AERODYNAMIC  
GASOLINE**

A balanced fuel especially adapted to airplane engines.

**SKELLY  
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Made from select mid-continent paraffin base oil.

**SKELLY ROCKER ARM LUBRICANT** is a solidified oil, free from soap.

**SKELLY MAGNETO OIL** is a pure mineral lubricant of the highest type.



(Oklahoma News continued)

instructor. In addition to the check given at the end of each ten-hour period, more dual instruction is given. Facilities for night flying which is included in the advanced flying courses are provided at the airport. In addition to the night air mail planes, sight-seeing trips are made and students are provided the opportunity of observing night operations.

Instruction in the ground school given in connection with the private flying course includes, instruments, theory of flight, airplane construction, meteorology, navigation, air commerce regulations and aircraft engines. Ground school instruction in the limited commercial and transport courses includes aviation terms, aerodynamics, airplane construction, aircraft engines, meteorology, aerial photography, radio and air commerce regulations.

## KANSAS

[EDWIN W. PRYOR]

**T**HE Swallow Airplane Company has added a cabin monoplane to its list of products. The new plane, a low-wing job, is the first commercial cabin monoplane turned out by Swallow, having formerly produced only open three-place and two-place biplanes.

The new plane is thoroughly streamlined, and is a four-passenger job powered with a 165-horsepower Wright Whirlwind engine. The wing is full cantilever, with a spread of 38 feet. The plane is 25 feet, six inches in length. The windows and door are large. The landing gear is entirely disconnected from the fuselage, the wheels joining directly to the wing with pants for streamlining. Swallow will go into production on the job as soon as an approved type certificate is secured.

**T**HE Hilton Super Mid-Wing monoplane, a ship embodying many unusual construction details, was successfully test-flown recently at Wichita. Ralph Hilton is the designer.

It has a full cantilever wing, unusual in a mid-wing job. It is a cabin plane, with seats for four and a pilot. The Hilton is powered with a 165-horsepower Wright and attained a top speed of 174 miles an hour. Its wing span is 37 feet.

**T**HE Aero Export Company, South American distributors for Travel Air, has issued a complete aviation catalogue in Spanish for export purposes. It is the only Spanish aviation catalogue published in this country, according to Carlos Rodriguez, manager of the export firm.

**A** SIGN, "Wichita Municipal Airport" has been painted on the roof of the municipal hangar at the Wichita airport. It is 12 feet high by 270 feet long, the length of the hangar roof, and answers requirements of the Department of Commerce. Flood lights make it possible for pilots to read it at night, and it can be seen from 4,000 feet in the daytime, pilots report.

**G.** A. STEARNS, of Wichita has secured the Kansas state agency for Curtiss Flying Service products. Ray Fields and Cecil Lucas will act as sales representatives for him in the new agency.

**T**HE Aero Supply Company of Wichita is to merge with the Johnson Airplane Supply Company of Dayton, Ohio, it was announced recently by E. S. Stephens, general manager of the Wichita firm. Definite plans have been made for the erection of a factory in Wichita by spring, and offices are to be enlarged.

E. A. "Al" Johnson of the Dayton company will be president of the new firm. Present directors of Aero Supply firm, Walter Beech, Lloyd Stearman, Clyde V. Cessna, J. H. Turner, and McGinnis Moore will remain on the board for the western section, and Mr. Stephens will remain as western general manager. Business east of the Mississippi will be handled by the Dayton plant.

**A** PRIVATE flying club has been organized in Wichita, under the rules of the Daniel Guggenheim Fund for the Promotion of Aeronautics, with Milo R. Foley supervising the organization. Arrangements have been made for hangar space at the municipal airport, and application has been filed for club rooms in the new administration building. E. C. Calder, Western Air Express field manager, will act as field manager for the club, and Roy Bird will be mechanic and instructor. An advisory committee, including A. E. Merriam, Marcellus Murdock, Roscoe Vaughan, and Jack Turner, will aid Mr. Foley in the operation of the club.

**T**RANSCONTINENTAL AIR TRANSPORT has purchased four Cessna four-passenger monoplanes powered with Whirlwind 300 engines for passenger service, according to Major Howard Wehrle, Cessna manager. The planes will be used to carry small loads to T. A. T. division points, and to take care of surplus loads on the regular line.

**T**HE Jayhawk Aviation Corporation has been organized to manufacture a light plane with folding wings. Officers of the new company are: W. B. Egolf, president; Leo J. Christopher, vice president; Dudley Eaton, secretary-treasurer; directors: A. O. Rorabaugh, J. J. Kindscher, A. Bruce Lovett, and Vern M. Wiley. The company is financed completely and will offer no stock for sale.

The first plane, designed by Thomas M. Finnie, is under construction. It will use a five-cylinder LeBlond engine, delivering 65 horsepower.

**A**IR transportation representatives of Wichita will meet once a month to discuss problems of air traffic, it was decided at a recent meeting of the representatives. Those present were E. A. Watkins, president of Central Airlines division of Universal; Charles McCollough, traffic man-

ager for Central; C. A. Nickerson, traffic manager for W. A. E.; Bob Authwine, T.A.T. representative; L. S. Seymour, manager of the Hotel Lassen, and Mrs. Madeline Ingels, Associated Airways ticket office agent.

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**B**IDS have been asked on the administration building for the Wichita Municipal Airport, according to L. W. Clapp, chairman of the park board. The project will cost around \$175,000, and will have passenger rooms, offices for airlines, a restaurant, and hotel rooms for passengers and pilots. A concrete apron for the municipal hangar has been completed, and all transport planes are required to taxi up to it to take on and discharge passengers, according to W. J. Patterson, airport manager.

A siren has been installed at the municipal airport to warn all planes in the air and on the ground to clear the way when passenger ships are approaching for a landing. The rule is that the way must be clear 20 minutes before an air liner's arrival and 20 minutes after its departure.

**T**HE Stearman Aircraft and the Swallow Airplane companies have both submitted planes to officials at Wright Field, Dayton, for tests by the Army. The two companies were selected from a total of twenty-three companies who offered planes to the Air Corps.

A Swallow TP, modified to meet Army requirements, and powered with a Warner motor, is being tested as a primary instruction plane. Stearman has submitted a plane to be used in advanced training work for Reserve officers and National Guard units.

**A** MID-WESTERN branch located at Wichita, Kansas, has been opened by the Consolidated Instrument Company of America, Inc., of New York. An entire floor of the Ritz Garage Building has been

## MODELS

## ... A New IDEAL Model Airplane



## The "American Eagle"

Wing Span: 26 in. Weight: 3 1/4 oz.  
Distinctive in design... new in construction... a light, durable, fast-flying model with IDEAL'S twenty years' experience behind it. Wonderful stability in the air, and GUARANTEED to FLY when hand or ground launched. Constructed largely of Balsa wood, with many new features; motor can be wound with winder without removing from fuselage; indestructible landing gear; new type propeller. Construction is easy.

**Construction Set \$2.50 Assembled Model \$5.30**

**FORD Tri-motor MONOPLANE. 3 ft.**

**Model. Construction Outfit \$8.50**

Sold by Toy, Sporting Goods and Department Stores. Ask for IDEAL Model Airplanes. If unobtainable, order direct. West of Denver, prices are 50c higher.

64 pg. Catalog of Models, Parts and Supplies for Builders. **5c**

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24-26 West 19th St., New York City

## 2 FOOT CURTISS HAWK



This model has flown over 300 feet. Complete construction set with plan..... **\$2.50**  
Blue prints alone..... **\$0.25**

**2 FOOT FOKKER UNIVERSAL**  
has flown over 500 feet. Complete construction set with plan..... **\$2.00**

**2 FT. JUNKERS MONOPLANE**  
Complete kit with plan and instructions. **\$2.50**  
Endurance Baby R. O. G. Kit - - **\$0.50**

Booklet 5c, credited on 1st order  
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## EQUIPMENT

The  
Budd Wheel  
Company  
Makers of Wheels  
for airplanes

Philadelphia and Detroit

leased for a period of two years and a stock of Consolidated instruments will be maintained. The branch will be in charge of M. E. Hulse and Prentiss Cleaves, Jr.

MANY important additions have been made to the courses of the college of aeronautics at Wichita University, according to Alexander N. Petroff, director of aeronautical engineering. A wind tunnel has been completed at the school and is being used, and a glider club has been organized. The Engineers' club will build a glider and experiment with it.

## ILLINOIS

[MRS. EDITH TILTON]

THE DeKalb County Airport at Waterman, Illinois, has completed the lengthening of its runways with the purchase of an adjacent field. The work of moving boundary lights and making other changes has been completed. The east-west runway will now be 2,000 feet long, instead of the 1,400 feet formerly. The north and south runway will be lengthened to 2,200 feet.

With these changes the DeKalb County Airport field is in the shape of an L with a 2,000 foot runway extending along the concrete highway No. 71 and a 2,200 foot runway at a right angle to the road.

THE curriculum of the Edgewater Flying Club at Chicago will be reorganized to meet the requirements of the Department of Commerce for flying and ground school instruction leading to pilot's licenses, according to a recent statement of the Club's officials. The ground school will be under the direction of Frank N. Bonta who will organize the school to meet the Government requirements for a rated school.

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3 long x 10 high  
8 " x 24 "  
12 " x 36 "

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BRIGHT CHROME ORANGE

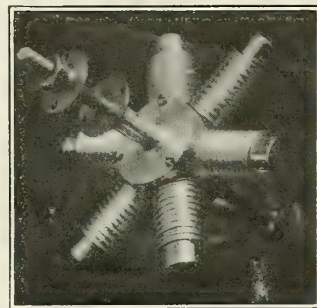
Highest Quality. Low prices. Immediate delivery

**AIR TRANSPORT EQUIPMENT INC.**  
GARDEN CITY, NEW YORK

NEW AND USED  
MACHINE TOOLS  
ELECTRIC MOTORS  
STEAM BOILERS  
AIR COMPRESSORS

Send for Complete List

**DELTA EQUIPMENT CO.**  
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## 6 Cylinder Model "Challenger"

Build a model airplane and use this finest compressed air motor. This is fastest, smoothest, most lifelike on market; 3/8" bore x 3/8" stroke; 3 1/2" wide. 1200 R.P.M. 17" prop., flies 4 1/2 to 6 ft. models.

## PRICES

Weight of motor, 4 oz. Price, \$16.50  
8 cylinder motor..... **\$22.50**  
Tanks ..... **\$12.75 up**

Send 10c coin for catalogue.

## Miniature Aircraft Corp.

83 LOW TERRACE  
NEW BRIGHTON, N. Y.



U. S. MODEL  
JUNKERS "BREMEN"  
40" Wing Spread

**COMPLETE CONSTRUCTION OUTFIT**  
for the above SENT POSTPAID, **\$8.50**  
**COMPRESSED AIR MOTORS**  
All Parts adjusted ready for soldering.  
2 Cylinder Motor and Tank..... **\$8.25**  
4 " " " "..... **12.50**  
SINCE 1909 WE HAVE SUPPLIED Model Airplanes and Accessories to Schools, Stores and Aviation Clubs.  
Ask for the U. S. MODELS at your local Store or order direct from us. Complete 56 pag. illustrated CATALOGUE SENT TO YOU FOR 10c.  
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## EQUIPMENT

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FLYING TOGS

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## NEBRASKA

[JAMES R. LOWELL]

**OFFICIALS** of the Nebraska Diamond Jubilee celebration held at Omaha in November, state that Omaha should plan to spend \$30,000 or more next year on its air show and circus. The air show staged in conjunction with the 1929 celebration was a success.

Errett Williams, piloting an Eaglerock Bullet, was adjudged winner of the \$1,000 first prize in the Brandeis-Jubilee air derby in which seven pilots flew over the 320-mile course. The award was based on average speed, pay load and piston displacement. Williams registered an average speed of 143.1 miles an hour. Bill Grigsby, flying a Spartan, was second; and Bill Ong, in a Ken-Royce, was third. Other entrants and planes were as follows: Ted Wells, Travel Air Mystery Ship; Frank Grace, Waco; Chief Bowhan, Cessna; and Gene Shacher, Travel Air. In the 25-mile race, Arthur Chester of Joliet, Ill., was first, Jack Kolbenslag of Lincoln, second, and Andy Neilson of Omaha, third. Andy Neilson won the dead stick landing contest, missing the flag by slightly over four feet. Second place went to Cliff Burnham of Omaha, while third place was taken by Mac King of Ames, Iowa. George Brandeis gave \$1,500 in prize money to aid in staging the event.

**DON FLINT** has been appointed sales manager of the Sidles Airways Corporation of Lincoln, Nebraska. Mr. Flint was formerly in the sales department of the Nebraska Buick Automobile Company.

**A** CONFERENCE to discuss aviation rules was held at Lincoln, Nebr., on November 14 at the request of the State Railway Commission. Those in attendance included county attorneys and county sheriffs, representatives from 20 chambers of commerce, 20 police chiefs, Nebraska plane manufacturers, flying school operators and pilots. Topics discussed included provisions of the Nebraska air laws passed by the 1929 legislature, requirements of the law under regulation of the railway commission, requirements necessary for pilot and aircraft licenses and aircraft traffic laws.

The 1929 Nebraska Legislature placed in the hands of the Railway Commission the enforcement of the new air laws, which have been patterned after the national act and are intended to promote public safety by requiring licenses for all pilots, and by forbidding the use for passenger purposes of planes not having the government stamp of approval. No funds were provided for the enforcement of the laws, however, and the commission has had to depend largely upon the coöperation of local officers.

**THE** Arrow Aircraft and Motors Corporation at Havelock, Nebr., is now delivering an average of three ships a week to the Saunders Fly-It-Yourself System at Kansas City in connection with the contract signed between the two companies for the sale of 100 Arrow Sports. Arrow production is averaging three ships a day, the bulk of the ships produced being the new Arrow

Sport Pursuit jobs powered with Kinner engines and having a top speed of 127 miles an hour.

B. P. Vlast, recently with the Duncan Airways at Cleveland, is a new district sales manager for Arrow, being in charge of the north-central territory which includes, Ohio, Indiana, Illinois, Wisconsin, Minnesota, Kentucky and Iowa.

The Kinner Airplane and Motors corporation of Glendale, Calif., has moved its district motor repair depot from Omaha to the Arrow Aircraft plant at Havelock. W. C. Moffat from Kinner factory is in charge.

**THE** Arrow Aircraft & Motors Corporation of Havelock has appointed the following dealers as a part of its recent sales expansion program: Parker B. Abbott, San Francisco; Beltz Brothers, Bazine, Kansas; G. G. Davidge, Los Angeles; Frank E. Vrooman, Kansas City and Western Missouri. The Acosta Aircraft Corporation is New York and New Jersey dealer for the Arrow.

**WORK** has been started on a 100 by 80 foot hangar for the Lincoln Flying School at the Lincoln Municipal Airport. A heating plant will be constructed near the northwest corner of the building. Another hangar on the field will be built next spring by Lincoln Airways, Inc., an affiliated firm. E. J. Sias, formerly in charge of the Lincoln Airplane School, is president of both corporations.

**THE** Omaha Bellevue Airport Corporation of Omaha has filed articles of incorporation with a capital stock of \$500,000. Harry J. Rossner and E. R. Hume head the new enterprise as vice president and secretary with James E. Kintner as president. The site selected for the new airport is a 340-acre tract just east of the government airport at Fort Crook, Nebr.

**MOST** of this season's work on the Omaha Municipal Airport was completed the latter part of October. The beacon tower has been constructed, floodlights mounted, boundary lights placed, switch house completed, two runways laid and oiled, with a third runway partially completed, and the drainage system installed. There are now three hangars on the field.

**CLASSES** of the Nebraska Sailplane and Aviation School are being held at the Omaha Y. M. C. A. A soaring plane, similar to the German *Konsul* is to be built at once. C. S. Wilson is in charge of instruction.

## IOWA

[R. W. MOORHEAD]

**PETITIONS** are being circulated at Fairfield, Iowa, asking the city council to call a special election to authorize issuance of bonds for the purpose of establishing an up-to-date municipal airport. The chamber of commerce has had an option on a tract of land for some time, and has discussed plans to establish a privately owned field. Many believe, however, that such a public

improvement should be a municipal affair. A committee composed of R. B. Loudon, R. P. Thoma and Fred W. Jericho, has been at work on the airport plans for several months. It is estimated that such an improvement would cost approximately \$50,000.

**IOWA CITY'S AIRPORT** is to be municipally owned as a result of action recently taken by the city council. Following approval by voters of a \$70,000 bond issue, the council has voted to purchase 194 acres at the site of the local airport, paying from \$275 to \$300 an acre.

**YELLOW CAB AIRWAYS, INC.**, will soon begin construction of an all-steel addition to the present office building at the Des Moines Municipal Airport, according to announcement of H. M. Millhaem, director of the organization. The building, which will be erected immediately north of the present office structure, will house the radio-plane communication station to be installed by the Boeing Air Transport Company. Additional improvement calls for the landing field near the hangar to be graveled, and a parking lot for automobiles to be staked off.

### Davenport Airways Take Over Cram Field

**THE** Davenport Airways, Inc., was formed recently at Davenport, Iowa, to take over Cram Field in that city. The organization is capitalized at \$100,000. Officers and directors of the corporation are: E. P. Adler, president; Ralph W. Cram, vice president; Louis E. Roddewig, secretary; J. J. Brus, treasurer, and L. M. Pedigo, general manager.

Cram field comprises 115 acres and is an L shaped field. East and west the field is one half mile long and north and south, at the west end it measures approximately 2,000 feet. There is sufficient acreage adjoining the field to provide for future expansion.

One of the first improvements planned is a new modern hangar and immediate steps will also be taken toward properly lighting the field. These improvements will be made with the \$20,000 which will be secured through the lease with the city.

## MINNESOTA

[ARTHUR G. PATTERSON]

**CONSTRUCTION** work on the Duluth Municipal Airport is now completed to the point where airplanes are able to use it for landings and take-offs. Though the construction work is not all completed, planes are using the field daily and activities at the port are increasing rapidly. The municipal airport will be dedicated July 4, 1930.

### Universal Flying School at Wold-Chamberlin Field, Minneapolis, Minn.

**THE** Universal Flying School at Minneapolis, formerly known as the Mid-Plane Flying School, is located on Wold-Chamberlin Field, midway between Minneapolis and St. Paul, Minnesota. Flying courses are given at the field and ground school classes, formerly held in conjunction with Dunwoody

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Institute, have been moved to downtown Minneapolis in a general expansion of this branch of the organization. The Universal Flying School at Wold-Chamberlin Field was approved on August 9, 1929, by the Department of Commerce for training courses leading to private, limited commercial and transport pilots' licenses.

Located on Wold-Chamberlin Field are National Guard and Naval Reserve hangars and the terminals of two large transport lines and air mail lines. In addition to the flying school, Universal Aviation Corporation operates at the field a flying and air taxi service. The Mohawk and Waldron airplane factories are situated in Minneapolis and students of the Universal school are taken on instruction trips through these plants as part of their courses.

The training planes of Universal Flying School are housed at the field in steel hangars in which repair shops are maintained. A brick building adjoining the hangars houses the passenger station, waiting room, school field office and rest rooms of the Universal Aviation Corporation.

Upon passing the physical examination and enrolling in the Minneapolis school of the Universal Aviation Corporation, students begin training immediately. All training is done in modern production, government licensed planes. Students are trained according to a schedule which has been prepared and their work is checked at intervals. A final check is made at the completion of a flying course and the student is not graduated until he is able to pass the final check which covers points necessary to pass the examination of the Department of Commerce. A special pilot's ground course is included in the flying course.

The private license course covers ten hours of dual flying and ten hours of solo flying. Before making his first solo flight a student is drilled in stalls and spins. Five to eight weeks are required to complete this course. The Universal limited commercial course covers fifty hours of instruction, twenty hours of dual and 30 hours of solo. Training is given in approaches, landings, takeoffs, cross-country flights, stalls, spins and acrobatics. All Universal students are provided with parachutes and instructed in their use before they are permitted to perform acrobatics. The transport pilot's course covers 200 hours of flying and includes the instruction given in the limited commercial course. Training is given in instrument flying, and instruction in handling cabin planes. The use of a plane to take the Department of Commerce examination is included in the transport course.

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# FOREIGN NEWS IN BRIEF

Compiled from reports from AERO DIGEST'S correspondents and the Aeronautics Trade Division, Bureau of Foreign and Domestic Commerce.

## ENGLAND

THE British Air Ministry recently announced that a Royal Air Force team will not again be entered in the Schneider Trophy contest and that British participation will be left to private enterprise under the auspices of the Royal Aero Club.

Expenditure of public money involved by government participation was declared no longer justifiable for two main considerations which influenced this decision. The Air Ministry stated that, owing to government participation in the Schneider Trophy contest, the race has assumed a character not in accordance with the intention of M. Jacques Schneider, originator and donor of the trophy. It was explained that although the entry of a Royal Air Force team was calculated to give an impetus to the development of high speed aircraft, sufficient data has already been collected for practical development in this direction.

The Air Ministry requested that the decision to withdraw Royal Air Force teams from the Schneider Trophy contest have no influence on the participation of British machines and pilots in future contests and urged participation in what it declared to be a sporting international event on a basis of private enterprise.

## GERMANY

[EDWIN P. A. HEINZE]

A NEW gliding endurance record was set up recently by a German military officer, Dinort, on October 20th in the Rossitten air-sailing territory on the Baltic coast of East Prussia. Dinort used a sail plane designed by Schwabe. He started on Saturday afternoon, the 19th of October, at 3:19 o'clock and remained in the air for 14 hours, 43 minutes and 25 seconds. The greater part of the flight was accomplished in the darkness. The old record stood at 14 hours 7 minutes and was established by Ferdinand Schulz on May 3rd, 1927.

The endurance sail flying record has been in German hands since 1925 without interruption and the record times have been considerably enlarged.

The first gliding feat recorded was a flight by Wilbur Wright in 1909 of 9 minutes and 45.4 seconds duration. Then followed a

long interval till August 30th, 1921, when the German Klemperer made a sail flight of 13 minutes 3 seconds duration in the Rhöen air-sailing region. A few weeks later, on September 13, another German flier, Harth, remained in the air for 21 minutes 37 seconds. A considerable step forward was made the following year, when the well-known German sail-flier Martens, on August 18, 1922, sailed for an hour. The day following, however, Hentzen doubled this time; and five days later, on August 24th, more than trebled it by sailing for 3 hours 10 minutes. All these flights were executed in the Rhöen territory.

In the following year a Frenchman, Maneyrol, flying in England, took the laurels from the Germans. On January 21, 1923, he remained in the air for 3 hours 22 minutes, and the next day he made a tremendous stride forward by staying up for 8 hours 4 minutes and 50.4 seconds. Ferdinand Schulz first made himself known the following year when, on May 11, he stayed in the air for 8 hours, 42 minutes, 9 seconds at Rossitten. Massaux of France, flying at Vauville on July 26, 1925, remained in the air for 10 hours 19 minutes 43 seconds. A few months later, Schulz definitely brought back the record to Germany by flying in the Russian Krim for 12 hours 6 minutes 22 seconds. This record was not superseded till May 3rd, 1927, when Schulz himself beat it with the sail flight already referred to, of 14 hours and 7 minutes duration.

THE Scientific Aviation Association of Germany. (Wissenschaftliche Gesellschaft für Luftfahrt) held its annual meeting in November at which many interesting papers were read, amongst others being those by Dr. Dornier, Dr. Rumpel and Dr. Gasterstadt of the Junkers company. The latter gave a review of the research work carried out by his company on Diesel aircraft engines.

ON October 29th a special mail ship of the Luft Hansa piloted by Joachim von Schröder made a record flight from Constantinople to Berlin. The machine started at 3 o'clock in the morning and reached Berlin at 1 o'clock in the afternoon. The 1250 miles between the cities were covered in 10 hours and the mail was actually de-

livered to the recipients within 12 hours after leaving Constantinople.

DURING a model flying contest in Germany, Gabler of Halberstad succeeded in establishing a new long-distance record for airplane models with fuselage and rubber motor. The former record of 1,443 feet was held by Möbius of Hanau. Gabler's model flew 1,748.6 feet and remained in the air for 84.2 seconds.

THE Opel Works, Germany's largest producers of motor cars, has presented the Rhöen-Rositten Gesellschaft with a sum of 8,000 marks (\$1,900), to carry through a sail-flying competition that is to end at Rüsselsheim, the site of the Opel factory. The Rhöen-Rositten Gesellschaft heads the organization of sail-flying in Germany and is responsible for most of the sail-flying contests held. According to the conditions set by the Opel company, the sum is to be awarded to sail-fliers landing at Rüsselsheim and traveling a distance by air of at least 62 miles.

Since Rüsselsheim is situated on a plain it is difficult to reach by soaring, but German experts believe that, in view of the recent successes attained by using the up-wind of clouds, it will be possible before long to make such a flight. They state that it will soon be possible to carry out glider flights from the flat ground, as scientific research of wind conditions under clouded skies has developed far enough to make this feasible. In this event sail-flying would receive a tremendous impulse as a sport, for it would then be independent of country especially suitable to this type of flying.

## Graf Zeppelin to Start Arctic Flight in April, 1930

THE dirigible *Graf Zeppelin* will make a trip next April to the vicinity of the North Pole for scientific purposes under the auspices of the Aero-Arctic Society. The principal objects of the expedition, according to Dr. A. Wigand, director of aerological service of the German government, will be to mark the boundaries between the deep and shallow parts of the seas of the Arctic Basin, to study meteorological conditions and to prepare for the founding of scientific observation stations on the ice fields.

The *Graf Zeppelin* is scheduled to leave Friedrichshafen about April 1, 1930, piloted by Capt. Ernst Lehmann, with a crew of 34 men and a group of twelve scientists headed by Dr. Fritjof Nansen, Norwegian Polar explorer.

On the route tentatively planned the *Graf Zeppelin* will fly from Friedrichshafen to Tromsø, where the Norwegian government has erected a mooring mast and placed a landing crew at the disposal of the expedition. From there the airship will start on



Latest type Focke-Wulf monoplane used by the Deutsche Luft Hansa

(Continued on next page)

the first leg of the Arctic voyage over Spitzbergen, Arctic Greenland and the northern edge of Canada, to Fairbanks, Alaska, a distance of 4,000 miles. At Fairbanks the citizens have financed a mooring mast, which is now being erected. Next on the dirigible's route will be a 4,000-mile voyage extending almost to the North Pole, returning to Fairbanks for conditioning and refueling. It will then proceed north of Bering Strait and along the northern boundary of Siberia and Russia, back to the starting point at Tromsø.

The expedition will use the mooring masts as bases, and will, on its flights, descend to the ice and use polar dogs for surface explorations. The scientists hope to find locations for practical observation stations where members of the expedition can live for periods of a year. Deep sea soundings from the air and by photography will be made to map the uncertain northern boundaries of the continents. The Aero-Arctic Society proposes to make weather observations with a view to the eventual establishing of meteorological stations in the Arctic so that the weather of the world may be forecast further in advance than is now possible.

**TESTS** of an adjustable-in-flight airplane propeller have been successfully completed by the Haw Metal Propeller Works of Germany. The propeller is made of hollow aluminum alloy, and the pitch of the blade may be regulated from a control on the pilot's instrument board while the plane is in flight and the blade is in motion.

A company is in the process of formation to manufacture and sell the products of the Haw Works in the United States. It will produce the Haw adjustable-in-flight propeller in America.

**WEATHER** charts have been sent by radio to a plane in the air in experiments conducted in Germany by the Deutsche Luft Hansa. A Fultograph apparatus for the reception of radio pictures was attached to the radio outfit of a Junkers plane. A weather chart, a sketch of the landing place and a graphic description of an approaching thundercloud were sent from the ground and received clearly by the radio apparatus in the plane. The tests will be continued with the object of equipping German planes with Fultographs, the invention of Capt. Fulton, an Englishman.

## AUSTRALIA

**THE** Queensland and Northern Territory Aerial Services, Ltd., of Australia, recently completed the construction of an airplane in its Longreach workshops. This is the eighth ship built by the Quantas organization in its shops.

The latest product is a four-passenger plane powered with a Bristol Jupiter 450-horsepower engine. It has a cruising speed of 110 miles per hour.

**A** NEW airport is being constructed by the New South Wales Aero Club at an estimated expenditure of \$110,000. The project includes the clearing, levelling and

# ITALIAN CIVIL AIR REGULATIONS

**TO** encourage the use of private aircraft by civilians and commercial organizations, the Italian government has provided airport facilities and service for private planes. The facilities of many of the government airports throughout Italy have been placed at the disposal of private airplanes of both national and foreign registration. All services thus afforded are governed by regulations prescribed by the Ministry of Aeronautics, and a schedule of moderate fees has been adopted.

Charges for ground services in connection with the landing and departure of airplanes are assessed according to the circumstances of the usage and the size of the power plant in the plane. For transient planes these vary from 12 lire for planes with engines up to 50 horsepower to 48 lire for planes of over 600 horsepower. The landing fees are reduced to a range of from 4.80 to 30 lire for planes making frequent landings, and from 2.40 to 21.60 lire for those renting hangar space and supplying their own service. Ground service for planes in these last two categories is paid for monthly with a minimum charge for six landings and six departures. All government planes are accorded service free of charge, as are other planes owned by certain passenger airlines which have agreements with the government allowing them free use of the airports. Ground service charges are also waived for private owners, who house their planes at the field, when trial flights are made provided that such flights do not extend over the boundaries of the field and are made without passengers.

Charges for the temporary housing of private planes under the governmental rates range from 18 to 60 lire per day. At some airports there are hangars available on a monthly basis with a minimum rental period of three months. Rentals are figured at 30 lire per cubic meter per month, the maximum dimensions of the plane being the basis for determining the space rented.

The ministry also considers applications from private persons or companies for permission to construct at airports such hangars, barracks, repair shops or other buildings necessary for aviation activities, providing space is available and such concessions, if granted, will not interfere with normal governmental activities. Rentals for such purposes are made for a minimum period of six months and are calculated at the rate of .18 lira per square meter per month.

Landing fees for planes of less than 300

drainage of 214 acres of land, and the construction of hangars, service stations, mechanical shops and administration buildings. A clubhouse is to be erected later at a cost of \$85,000. In three years of activity the membership of the New South Wales Aero Club has increased from 60 to 300 members, more than half of whom are flying members. During this period, the aero club has trained eighteen per cent of the student pilots in the British Empire.

horsepower include services of an engine specialist and one mechanic, and for planes of more than 300 horsepower, services of an engine specialist and two mechanics. These men are authorized to start engines, refill fuel tanks and to make any small repairs which take no longer than half an hour and which require no material or spare parts which have not been transported on the plane. All other repairs or services are to be charged for at scheduled prices.

National airplanes are permitted free circulation within the kingdom providing that the following provisions have been complied with: possession of a valid certificate of navigability which is issued every six months following official examination of the plane; possession of a registration certificate issued by the Division of Civil Aviation and Air Traffic, Ministry of Aeronautics; operation by a crew, each member of which holds a valid license for his particular function; possession of a detailed list bearing names and addresses of any passengers carried; possession of proper documents if carrying merchandise; possession of a prescribed log book; and possession of a valid radio broadcasting license if the machine is equipped with such an apparatus.

Planes which bear foreign registration in countries with which Italy has air treaties are also allowed free circulation over Italian territory without making application to the authorities for permission if they are in possession of the documents listed, whether these documents are issued by the Italian government or by the government with which the plane is registered. Planes registered in countries other than those included in Italy's reciprocal treaties must apply for permission for free circulation before entering the country.

There are thirteen zones in the kingdom which are strictly closed to all planes except Italian military and naval machines. The largest of these extends along the entire northern frontier of Italy, from the Mediterranean to the Adriatic, and is approximately 700 miles in length and varies from 30 to 60 miles in width. Flight over this zone is strictly prohibited to all civil and foreign planes except at certain points where established routes cross the zone. There are six of these routes. The other twelve zones surround certain cities and communities where military and naval bases and other works are located. Passage into or through some of these zones may be made along certain prescribed routes and at the discretion of the authorities.

## SIAM

**A**IR routes penetrating into the interior of Siam have been in operation for a period of six years without an accident to a single passenger. During that time, 244,184 miles have been flown, 3,697 passengers carried, 17,086 bags of mail transported and 64,711 tons of merchandise carried. The air services are operated principally in the north-east provinces which the railroads have not reached.



## MEXICO

[MONT HURST]

OPERATION of the aviation radio stations and the portable sending and receiving sets now carried on the trimotored planes on the Brownsville-Mexico City line has proved highly successful and of immense benefit to the company in maintaining dependable service. Weather conditions are wirelessly in advance along the route, both to and from the main stations, and to the planes in the air along the line. Four cen-

tral stations are now in use by the line—at Tampico, Mexico City, Vera Cruz and Brownsville. Within a short time radio service will be extended to include all of the flying fields of the company.

### Mexican International Airports Named

A RECENT Mexican federal executive decree makes the following places official international airports; Matamoros, Nuevo Laredo, Piedras Negras, Nogales, Mexicali, San Miguel de Cozumel, Tijuana, Mariscal and Progreso. Mariscal is on the

Guatemalan border. Immigration, customs and health stations and offices will be established at all the airports named.

IT has been announced that thirty bombing planes will be purchased in the United States soon by the Mexican War Department. Money for the purchase has been appropriated by the government and two expert fliers have been commissioned to go to the United States to inspect various makes and types of planes, and make the selection. General Azcarate, chief of the aeronautical division, has issued an order permitting re-enlistment in the air force of several fliers who have been otherwise employed.

## Canadian Aviation Progress in Figures

BY JAMES MONTAGNES

THAT Canadian aviation will more than double its activities in every line before the year is out is the prediction of civil aviation authorities at Ottawa. The increase in ships, air mail poundage, flying club members, commercial pilots, air harbors, and miles flown, is the basis of this forecast.

Flying club memberships in Canada increased from 2,403 at the end of 1928 to 4,650 at the end of September. This increase is due to membership drives, especially in the western cities, where private flying has gone ahead rapidly, and has taken the lead from the eastern centers. The Calgary Aero Club alone has 1,050 members; that at Saskatoon has 521, and ranks second in the list of government-subsidized flying clubs. The number of flying hours put in by the sixteen clubs in the Dominion increased from 8,124 hours in 1928 to over 13,000 hours for the first nine months of 1929. The Winnipeg club leads in time flown this year with 1,202 hours, an increase of 200 hours over its 1928 record. Calgary comes second with 1,018 hours flown, followed by Toronto with 912 and Regina with 835. This increase in flying time has resulted in an increase of pilots, there being 159 more private licenses held this year than last year. Thirty-two more commercial licenses have been issued flying club members, while figures show that there are 325 ab initio soloists. The number of all commercial pilots in Canada has increased by 103, bringing the total up to 296. The total number of private and commercial licenses in Canada is now 609. Air engineers have similarly increased in numbers, there now being 279 registered in Canada, of which 80 are this year's crop. Airports licensed have increased by seventeen, making the total 61.

The same large advances are noticeable in commercial flying in the Dominion. While there were but 233 planes registered in Canada last year and 64 in 1927, there are now 397 planes registered and licensed. Canada imported 58 airplanes, valued at \$593,772, from the United States during the first eight months of this year, nineteen engines at \$72,733, and airplane parts with a value of \$629,551. The total value of the eight months' imports from the United States was \$1,296,056. Airway operators decreased from 53 to 45 during the first quarter of 1929, due to amalgamations of companies.

### Canadian Aeronautic Figures

Number of Flying Clubs.....	16
Flying Club members.....	4,650
Hours flown in first nine months of 1929 by club members.....	13,000
Private air pilots.....	313
Commercial air pilots.....	296
Air engineers.....	279
Number of registered aircraft.....	397
Licensed air harbors.....	61
Number of airline operators....	61

The total of operators now stands at 61. Airplanes used by these operators are for the most part of American manufacture, a number of English planes being sold in Canada, but chiefly for private flying.

Statistics show that Canadians are becoming more educated to air mail. Last year 277,184 pounds of mail were carried on contract routes. The first six months of this year show 245,749 pounds carried. New routes have been opened this year, and the international traffic between Montreal and Albany has increased. Two new points of international air mail clearance have been established at Buffalo and Detroit, daily services leaving Toronto for these points. The fact that boat mail is carried by air has added considerably to the amount being carried by Canadian ships sailing from Montreal, as the time gained in this way offsets the advantages of faster ships sailing from New York, by which much of the overseas mail from Canada was formerly sent.

Commercial operations of airway operators have increased both in the southern part of Canada and in the northern expanses. Planes are flying far north this year on scheduled routes, especially along the Mackenzie River basin, taking prospectors and fur traders between the various trading posts of the region. One company reports a taxi service at Aklavik, 150 miles north of the Arctic Circle. Aerial photography by commercial operators has increased, there being more operators employed in this work this year than ever before. Large sections of the Gaspé Peninsula in Quebec have been recently photographed, as well as other sections of Northern Quebec, Northern Ontario and British Columbia. One firm completed two thousand square miles of photography during the second quarter of the year in Northern Quebec.

RECONSTRUCTION and new building work on the central airport of Balbuena will be completed shortly by the Cia. Mexicana de Aviacion. Quarters for inspectors, postoffice, telegraph accommodations and custom offices, and new landing runs, are being built, and the field is being drained.

### Exemptions for American Pilots Attending Mexican Aviation Week

EXEMPTION from consular fees and other taxes, and the granting of special permits to cross the border and fly through Mexican territory over regularly prescribed routes, has been arranged to encourage the attendance of American pilots at the Mexican Aviation Week to be held in Mexico City, Mexico, from December 10 to 16, under the auspices of the Mexican Association of Aeronautics. An aeronautical exhibition will be held in conjunction with Aviation Week and special inducements have been offered to foreign exhibitors.

For the benefit of pilots of planes flying to participate in or attend celebrations and displays during Aviation Week, the association has called attention to the fact that Mexico City is 7,473 feet above sea level and planes must have a ceiling of at least 16,000 feet safely to reach or leave the valley of Mexico.

## CHILE

THE War Department of Chile recently announced regulations governing the use of airports by Chilean and tourist aircraft. The following airports were designated public fields and declared open to navigation and air traffic under certain specified conditions: Arica, Antofagasta, Copiapo, Ovalle, Santiago, Puente Montt and Punta Arenas. These flying fields may be used by all properly licensed Chilean aircraft without special authorization. The same privileges are accorded tourist planes belonging to countries of the Commission Internationale de la Navigation Aérienne.

Commercial or military airships of Chile and those not belonging to countries of the C. I. N. A., are required to obtain authorization of the Ministry of War to use the above airports.

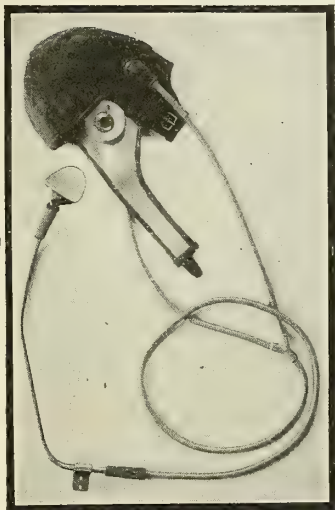
The War Department declared the following airports open to international traffic: Arica, Puente Montt, Punta Arenas and Santiago.

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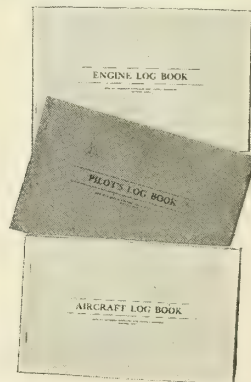
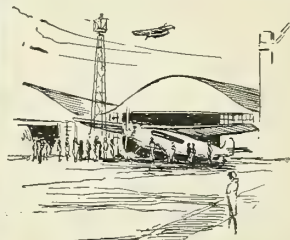
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## MUCH ADO AT ABERDEEN

(Continued from page 68)

miles away. A few flying bits of earth on the far-off horizon were the only visible proof of the destruction wrought; but those who stood and listened needed nothing more.

Then came the climax of the aerial show. Three Curtiss Condor bombers, one acting as flagship and leader, the others laden with a 4,000-pound bomb each, moved majestically up over the marsh land where the bombing planes lay their "eggs." At a smoke signal from the leader, one of the other planes let go its load—a ton of metal enclosing a ton of T.N.T.—and the distant spectators unconsciously braced themselves for the shock. To their surprise it did not come. A fountain of slime shot skyward where the gigantic bomb struck the earth, but it was a "dud" and there was no explosion. The bombers maneuvered into position again, and the second one unleashed its deadly "pay load." The eyes of the crowd followed its downward flight, and this time there was no disappointment. The instantaneous fuse in the nose of the great projectile functioned perfectly, a mushroom of flame and flying debris rising against the horizon with a terrific roar to mark the spot where the aerial "ash can" had fallen.

Subsequent investigation by the experts revealed that it had been a "normal" hit, leaving a crater nineteen feet deep and sixty-five feet across. A fitting end was put to this phase of the day's activities when a low-flying airplane, appearing unexpectedly from nowhere, drew a smoke screen curtain across the open air stage as if to say "the show is ended." Actually, it was demonstrating the efficacy of airplanes in shrouding the advance of ground troops from the eyes of enemy gunners, and it was impossible not to compare the swift perfection in which the speeding ship performed its mission with the slow and spotty results obtained earlier in the day by a chemical mortar battery striving to accomplish the same end.

From the "main front" the scene of activities now shifted to the anti-aircraft range, and the 61st Coast Artillery Regiment prepared to show 15,000 interested onlookers that a mere airplane hasn't got a chance when the "archies" rear back on their metallic haunches and begin to snap and bark at these annoying mechanical insects which insist on buzzing across the blue vault of heaven. A plane was summoned and began to tow a red sleeve target slowly back and forth in front of the guns. A battery of electrically trained machine guns sprayed the skies with bullets, the trajectory clearly outlined by the inevitable tracers. First the .30 caliber and then the .50's raked the gently waving sleeve as it followed a straight course at a known altitude and known range in front of the gunners. It seemed incredible that the thing shouldn't come down in shreds or dissolve in mid-air under this hail of gunfire, but strangely enough it not only weathered the storm but managed to preserve its virginal appearance.

Then another ship and another trailing red target appeared. The artillerymen licked their lips and spat upon

their hands grimly. The real fun was about to begin. Warned in advance, the onlookers stuffed their ears with cotton and waited for the "archies"—three-inch guns firing shrapnel—to start the make-believe carnage. Viciously, spitefully, the guns began to roar. Fleecy smoke puffs appeared against the blue sky, behind, below, above, beyond, before the slowly moving target. The gun crews sweated and swore under their breath; members of Congress and Cabinet officers were watching them and the target seemed to flutter derisively as their best efforts burst hopelessly and obviously wide of the mark. Again and again they tried, but not even a "fluke" shot would accomplish the thing they so highly desired and frequently achieve—cutting the tow line and bringing down the entire target in an impressive though rather meaningless flourish.

To make matters worse, when they finally gave it up and the most enthusiastic Ordnance men were shaking their heads and apologizing for a "pretty poor" demonstration, one of the jubilant airmen, who had been towing the target tamely just where it was wanted, pretended to have trouble dropping the untouched sleeve over the landing field and made this an excuse for flying back and forth several times at low altitude over the crowd so that they could see for themselves whether or not the sleeve was "full of holes." It was figuratively, as well as literally, a red rag waving above the disgruntled artillerymen, but for the moment they were entirely bereft of bulliness.

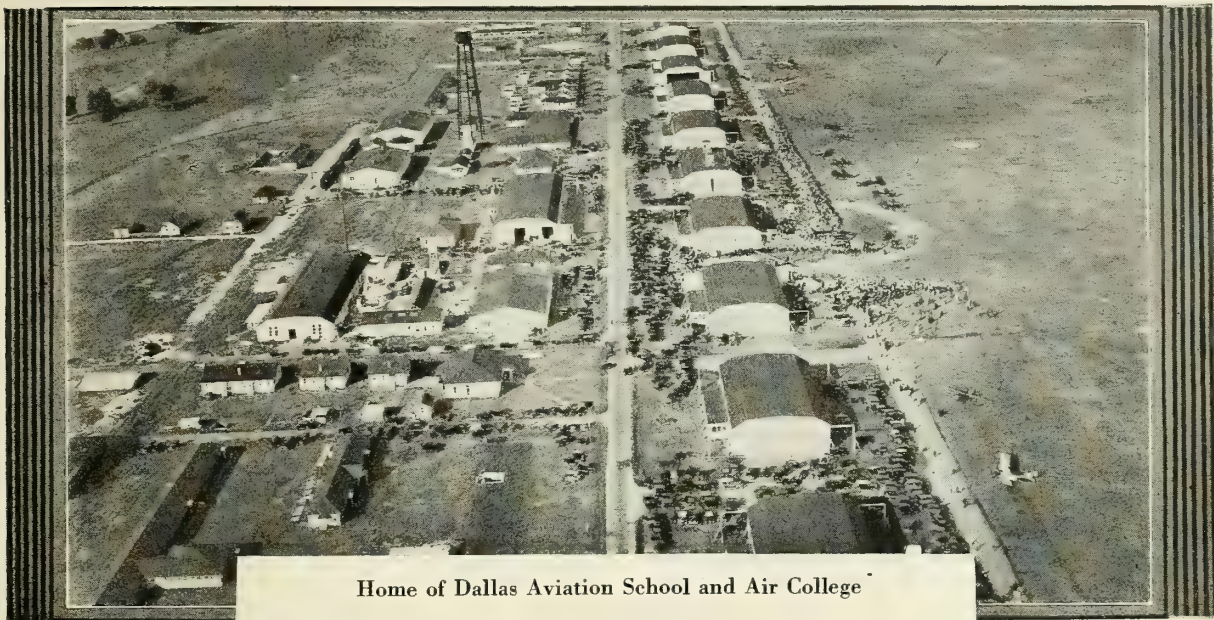
The climax of the artillery show was the firing of one round each from a fourteen-inch railway gun, which can hurl a 1,560-pound projectile twenty-five miles, and a sixteen-inch coast defense gun—the largest weapon made in this country—whose 2,100-pound shell has a maximum range of thirty miles. Probably for the first time in the history of the Ordnance Association's annual outings at Aberdeen, these events palled somewhat on the assembled public. The giant guns did not seem so deadly, somehow, after seeing an airplane drop a 4,000-pound projectile carrying 2,000 pounds of T.N.T. as compared to some 700 pounds of the same substance which is the maximum charge of the sixteen-inch rifle's shell. And thirty miles, once an impressive range, appeared rather ridiculous compared to the distance a bomber can fly before dropping its missile on a *visible* target.

Surprisingly, a high-ranking Ordnance officer, who came originally from the Coast Artillery, voiced the thought that must have been in many minds.

"We can't talk out of turn if we want to get along in the Army," he said, "but when it comes to putting a quarter of a million dollars in a gun like that, which never moves out of the place you put it and is useless after a hundred shots or so, or using it to buy bombing planes that can be shifted on a moment's notice to any flying field in the country, there isn't much room left for argument. It's a slow process, of course, but a lot of us are coming to see the light, although so gradually and imperceptibly we mostly don't realize we're coming around to another point of view."

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## THE FUNDAMENTALS OF WARFARE

(Continued from page 56)

and done successfully for a space—or the diplomat would not be with us.

There is no shadow of doubt about what we are or what we were. No amount of polite speeches, no series of handshakes, no treaties can alter the fundamental man that is you, that is I. History has proved it, again and again; and history will continue to prove it. Well-meaning, intelligent men, have met before and will meet again, honestly, sincerely endeavoring to curb this scourge called war. Their efforts will not be entirely abortive; some good will come from them. The League of Nations, cumbersome, silly, wordy, full of hates and distrusts and petty jealousies, handled by self-seeking and sometimes incompetent politicians, is yet admirable. It is a step on the road to a better civilization, though doubtless it will be carried away in the torrent of the next great war. But something like it, something better, will take its place. Man is struggling up from the darkness, and will persist. He will persist in the only way that it is possible for him to persist: by grasping for things, by fighting to protect them. *Even peace must be attained by those means.* Man cannot, except by infinitesimally small steps over an infinitely long time, become fundamentally other than what he is, which is what he has been since the distant days when we catch our first glimpse of him. Let a thousand MacDonalds greet a thousand Hoovers; they are no more than straws that show which way the wind happens to be blowing at the moment. Another moment and the wind may be coming from an opposite quarter. The fundamentals of our being cannot be changed by a breeze.

\* \* \* \*

WARFARE started when the first creatures battled with other creatures for something tangible or intangible. It might have been property or an idea. Mutual fear and distrust may have caused the first fight; the desire to possess a piece of meat may have caused it. The first fight was probably as reasonable and unreasonable as fights have been ever since. No doubt the first battles between men were over the spoils of the chase, or over the possession of women, which at that time were regarded as desirable property. Later came the tribal battles as to the ownership of land which raised crops or sheltered game. When written history takes up the story, man was already, and apparently for some time past had been, battling for land. And land it remains to this day. When nations go to war, it is to protect what they have or to acquire more land. For it is only on land that man may live.

From the day when the first wrathful or frightened man fought with another man or with an animal, to the present day when great armies and navies grapple with other armies and navies, the fundamental principles of warfare have remained unchanged. The weapons and the tactics change with the years; the principles remain the same. The principle of all warfare, generally speaking, is to strike a blow that will so incapacitate or discourage the opponent that he will relinquish his piece of meat or his land or his idea and retreat or die, leaving the field to the victor. Libraries have been written on the subject of warfare, but they have added nothing to the original principle. Only the methods have been elaborated.

Since the principles remain the same, we need concern ourselves here only with the methods, in an endeavor to discover precisely what methods are best suited to incapacitate an enemy so that he may be forced to retire leaving us the victor. And when we come to examine the methods

of warfare, we will learn that even they have not changed to any degree; they have only been elaborated.

The dawn man, when he grappled with an enemy, probably bit or clawed; it is too much to suppose that he had enough intelligence to strike a blow. His hand, in its natural shape, is not fitted to give a blow. Only when he learned to double the fingers into the palm could he strike a blow. At first he must have clawed and bit, as the larger primates do today. His fingers were prehensile and adapted to clinging to things; later they were used to pick up things. It is reasonable to suppose that only by chance could that dawning intellect have discovered that a stick or stone, held in the hand at the time an enemy attacked, could be used to batter that enemy. Finding this out by chance, the dawn man improved his fighting qualities by carrying with him at all times a large stone or piece of wood with which he could more efficiently batter an enemy than he could bite or claw him. A stone was probably the first weapon.

Later, much later, must have come the selected stone, battered into a more convenient or deadly shape; later still, the handle, which increased the dawn man's range of hostilities. Once the handle had been conceived, it was probably apparent to him, even with his limited intelligence, that he had the advantage of reach—of *range*—of his opponent armed only with a stone. With a handle only a foot long, he still would be able to smite his opponent while that opponent's hand, with stone upheld, would still be a foot away from him. If he in any degree approached his opponent in strength and skill, the added advantage of *outranging* him by a foot would assure him of victory.

Thus the advantages of outranging an enemy and doing him damage before the enemy could come within striking distance must have been apparent to the dawn man. When he had developed mentally to that point, it is probable that he was then sufficiently intelligent to experiment with other methods of increasing his range and striking power. Longer handles, heavier or better formed stones, must have led to a weapon somewhat resembling a lance. And somewhere about that time he must have discovered that he could throw the weapon at his opponent. That discovery also was probably due to chance; perhaps the axe slipped from his hand while he was swinging it. But however it happened, we know that he and his descendants evolved weapons that could be hurled, the last one of which, before the advent of gun-powder, was the arrow.

It is unnecessary here to trace the gradual evolution of weapons, for the weapons themselves are of no importance. It is only the results of the use of the weapons that make for victory or defeat; and it is only necessary to consider weapons as the means to an end. The point to consider here is not the weapons, but the methods of warfare, the general methods which have remained unchanged from the days of prehistoric man to the day of the admiral presently commanding the American Battle Fleet.

Briefly, the general method of waging war successfully is to follow a procedure that will cause the maximum of damage to an opponent and the minimum of damage to oneself. And, as even prehistoric man discovered, the best method for attaining that end is to use a weapon that will inflict damage upon the opponent while the opponent is unable to bring his own weapon into play. The principle of offense or defense first exemplified in the use of the stone attached to a handle, as opposed to the stone held in the hand, has never been improved upon. It was a fundamentally right method then; it is a fundamentally right method today.

(Continued on next page)

# AN OPEN LETTER to Ambitious Young Men



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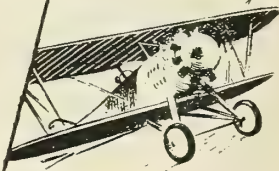
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(Continued from preceding page)

The man with the axe had the advantage of the man with the stone for one main reason: he had the advantage of reach, of *range*. While the opponent was trying to get to close quarters with his stone, the more advanced savage was already delivering a blow with his axe. And by the time the arrow was invented, the man with the axe was entirely *outranged*, was unable to deliver a single blow until he had covered the yards separating him from the bowman, during which time much might, and did, happen to him. If we allow that the man with the bow had an axe as well, which he would use at close quarters, we must grant that his advantage over his opponent was precisely that advantage afforded him by the use of the bow before the opponent was able to strike.

This method of trying to hit the other fellow before he can hit you, and to keep on hitting him while he is yet at a distance where he cannot retaliate, is today the only *certain* method by which a battleship in one navy may sink a battleship in another navy without being sunk or damaged itself. When the individual battleships are expanded into whole battle fleets, the parallelism remains, as the appalling losses, nearly equal, in the Battle of Jutland will testify. Two battleships, or two cruisers, of equal power if opposed to each other and if manned by equally efficient crews will do each other equal damage. They are on a par with the two ape men with stones in their hands; neither has any advantage of reach, of range, of the other. They can only pound away until one or the other is sunk.

How different is the fighting condition of two warships, one armed with guns capable of hurling a shell twenty miles, the other armed with guns capable of hurling a shell only fifteen miles. It is at once obvious that the ship able to deliver a blow twenty miles away may keep its distance of twenty miles and still deliver blows with telling effect; whereas the one capable of delivering a blow fifteen miles away will be unable to deliver a single blow unless it can reduce the distance between it and its opponent to fifteen miles. So long as the one has the range of the other the outcome of the battle will be in no doubt; it is only when *both* can deliver blows that any uncertainty as to the outcome of the battle enters.

\* \* \* \*

LET us reiterate that the fundamental method of achieving success in warfare is to administer as many blows as possible to the opponent while suffering as few as possible in return. The weapons are of no consequence; it is only the blows that count. A fleet able to fire a hundred shells a minute for a distance of fifteen miles would be sunk by a fleet able to fire only ten shells a minute from a distance of twenty miles. The fleet that has the range of the other will win.

Let us put aside for the moment all idea of warships as warships. They are no more than floating platforms on the sea, from which blows may be delivered to an opponent. The important thing is, not the warship, but the blow that it delivers to the other warship. That—to deliver a blow—is the *one* reason why the warship is there. It is merely a weapon from which something may be hurled. If the blow may be delivered as efficiently and at a greater distance with some other weapon, then the other

(Continued on next page)



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(Continued from preceding page)

weapon is more efficient.

Perhaps this point of view, novel to some who have not considered the problem, may need elaboration. The important thing is the damaging blow, and not the means by which it was inflicted. When nations engage in warfare, money, men, propaganda, battleships, airplanes, guns, bombs, submarines, mines, are merely so many weapons being used to inflict blows upon the enemy. The 16-inch naval gun, like the bombing airplane, is of itself unable to inflict any damage upon an enemy; it is only a weapon capable of hurling or dropping a charge of explosive that will deliver a telling blow. If the shot misses fire, if it is unable to travel the distance necessary to hit the enemy, it is obvious that it has done no damage to that enemy. It is only the hits that count. And if a battleship is unable to place itself in a position where it may deliver blows to an enemy, while the enemy is able to deliver blows to it, then that battleship will be sunk.

If, for example, two navies oppose each other across an intervening space of 200 miles of sea, the one armed with rifles capable of hurling a shell twenty miles, the other armed with airplanes capable of transporting a bomb 200 miles, it is evident that the navy using the airplane as a weapon will be able to deliver blows from a distance of 200 miles, while the navy armed only with rifles will deliver precisely none. In other words, the navy with airplanes has the range of the navy with guns. It may stay 200 miles or even twenty-five miles from the enemy navy and deliver with its airplanes blow after blow, suffering no damage at all to itself.

In this connection we may regard the big shell and the airplane with its bomb as being alike in one respect—they both are no more and no less than mediums for delivering a blow to an enemy. A shell that misses its mark, like a bomb that misses its mark, are equally impotent to inflict a blow. And it is useless to this present discussion to enter into comparisons of the effectiveness of shells and bombs, for the matter has been discussed before in these pages. Now we are discussing the fundamental methods of warfare, the underlying truths of warfare, which have remained unchanged since the day when prehistoric man first fitted a handle to his stone, which enabled him to outrange his enemy, to inflict damage upon that enemy before he could come to closer quarters.

The modern airplane is the evolution of that axe. It gives to the navy possessing it the power to stand off at a distance where it cannot be hit itself, and yet a distance from which it may hit the enemy. In all of the discussions that rage about the battleship and the airplane, this one fundamental point has been either disregarded or insufficiently stressed. The issue has been clouded alike by proponents of the battleship and of the airplane, when, as a matter of cold fact, battleships and airplanes, as such, should have no bearing on the matter. The only consideration that need concern a nation at war is the ability to deliver blows to an enemy while suffering as few as possible in return.

Navies as presently constituted, so far as their capital ships are concerned, depend upon armor to keep afloat and upon guns with which to inflict damage upon an enemy. In this modern day they are depending on guns as their main weapons; and guns have an extreme range of twenty miles. They are using airplanes, which have a range of 200 miles, only as auxiliary weapons. This dependence, I submit, is fundamentally fallacious. Compared to the airplane, the gun is a stone axe opposed to an arrow. What

(Continued on next page)

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(Continued from preceding page)

matters it that the axe may deliver a more deadly blow than the arrow if the man with the axe is killed before he can come within striking distance of his foe?

Another thing our prehistoric ancestor learned was that speed and the ability to move about quickly had a very noticeable effect upon the outcome of a battle. He found that by using a horse he could dash upon his standing foe, inflict a blow, and be away again. On a level plain the mounted man had a distinct advantage over the dismounted man. And the sea is a level plain of water; the navy cannot hide itself, nor can it dig in and throw up barriers of earth. A foe of superior speed may dash in, deliver blows, and hurry away. Superior speed enables a navy to give or refuse battle at will. And the navy that has speed, whether it has it on the water or in the air, will have the advantage of a navy that is slower.

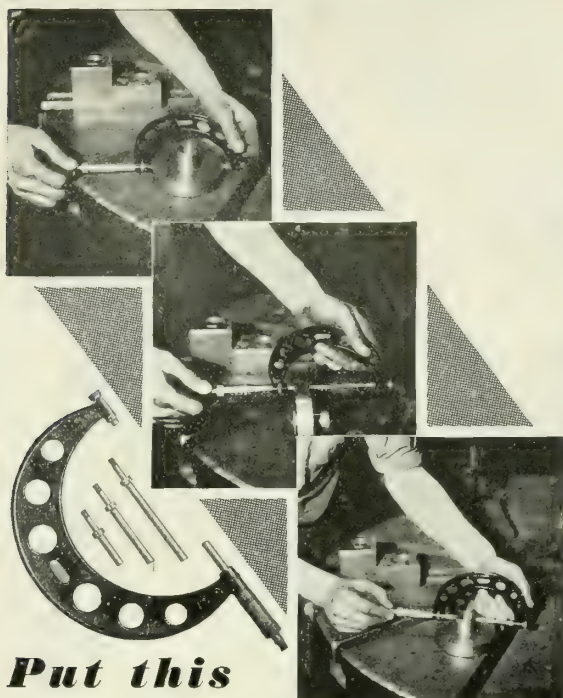
The battleship, the present capital ship, has very little speed; the airplane carrier, the coming capital ship, has great speed, as speed is measured upon the sea. It has speed in itself, and in its airplanes it has range. It is half as fast again as the battleship; it has ten times the effective firing range of the battleship. Opposed ship to ship, a battleship would have absolutely no chance with an airplane carrier. The carrier could overtake the battleship or run away from it, as it chose; it could stay at a distance of 200 miles and deliver blows that the battleship could not return unless it could close the intervening distance to within twenty miles. And, inasmuch as the carrier has superior speed, the battleship would be unable to overtake it. The carrier could hit the battleship at will; the battleship could not hit the carrier at all.

It is useless, almost pointless, to argue that the battleship is armored, the carrier is not. The carrier is armored more efficiently with superior speed, with vastly superior range. The carrier may offer or refuse battle; the battleship must accept, for it cannot escape. The carrier has the initiative.

Remember again that a battleship as a battleship, a carrier as a carrier, have no bearing on the outcome of a war. It is only the blows they are able to deliver that have any effect, one way or the other, upon that outcome. What matters it that a battleship can deliver a telling blow at a distance of twenty miles if the enemy refuses to draw nearer than thirty miles? The battle will be won by the party who can deliver the most damage to an opponent and suffer the least damage in return. That is a fundamental of warfare; battleships, carriers, guns, airplanes, are only weapons; and weapons, and their relative efficiency, change from day to day. The fundamentals remain the same, yesterday, today, tomorrow.

The airplane, like the long range naval gun, is a weapon designed to deliver a blow to an opponent at a distance. It cannot of itself occupy the area of the sea any more than a gun can do it. It must, like the gun, be carried on a ship. Forget that an airplane is an airplane, a gun a gun; both are mediums, weapons, for delivering a blow. The ships that carry those weapons are capital ships: the battleship the capital ship of yesterday, the carrier the capital ship of tomorrow. Today the issue is clouded in a haze of distrust and doubt; the battleship enthusiast confronts the airplane enthusiast, each condemning the other. Time alone will settle the controversy.

Meanwhile, as I have endeavored to point out, the fundamentals of warfare, like the fundamentals of human nature, remain unchanged.



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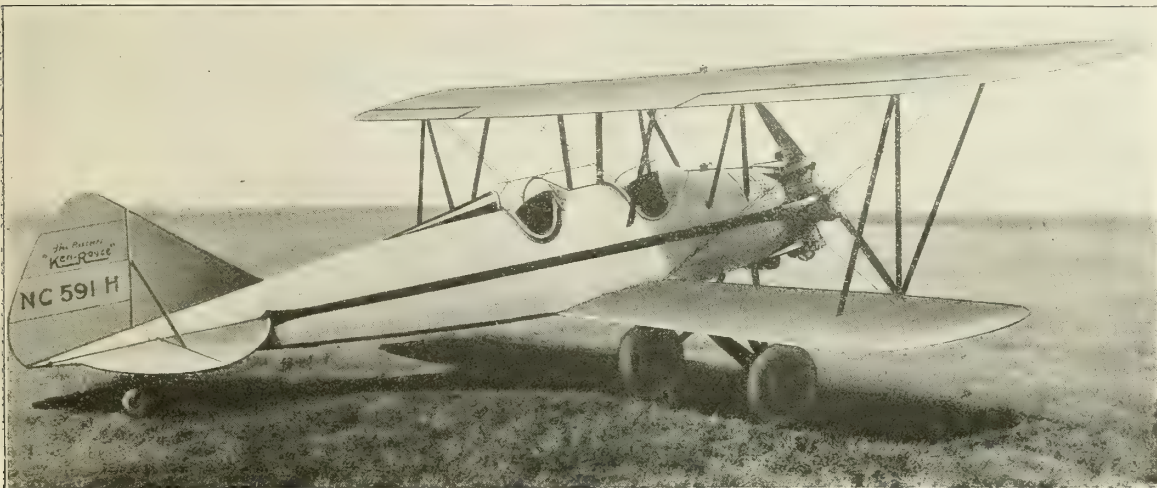
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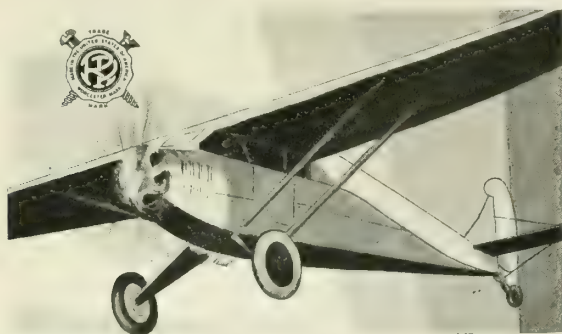
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## AERODYNAMIC SAFETY FACTORS

(Continued from page 82)

control surfaces has nearly achieved a conciliation of inherent stability with adequate control and maneuverability. Although the problem of control in normal flight has been successfully solved by research and wind tunnel tests, there remains still one phase of flying which presents a peculiar unsolved problem.

### Stalled Flight

The stalled flight condition is usually referred to as flight at angles of attack very close to the so-called "burble" point of the cell or wing, as the case may be.

From wind tunnel experiments, we know that the lift of an airfoil increases as the angle of attack increases up to a certain point, after which it begins to decrease. This angle is known as the "burble" angle, and because of the inefficient airflow corresponding to it, the ailerons lose their effectiveness and the pilot lacks lateral control. Although it is customary to associate the dangers of stalling with nearness to this particular angle, it is my opinion that the real danger of stalling is present somewhat sooner.

A study of the curve of horsepower required to fly reveals that at speeds above and below that corresponding to the speed of flight at minimum power, the pilot must open the throttle in order to fly level. Though it is logical that to gain an increase in speed one must increase the output of the engine, the second behavior is not so evident; and it is my hypothesis that a number of involuntary stalls result not only from actual stalling but from the fact that the pilot does not know that beyond that particular point of minimum power he must open the throttle rather rapidly in order to prevent a stall. I suggest calling the speeds corresponding to the left branch on the power curve of the horsepower required, the region of unstable flight, since it requires an inverse maneuver of controls and throttle.

When the plane is stalled, the airflow over the wings becomes turbulent and the aileron efficiency is considerably reduced. Lack of lateral control is aggravated by the presence of an undesirable yawing moment which normally accompanies the ordinary aileron action in a stall. Assuming that the pilot involuntarily approaches the stall and there is a lateral disturbance which raises the right wing, he may unconsciously attempt to correct it by moving the stick to the right, thus lowering the left aileron and raising the right one. The left side of the wing will pass the burble point with a consequent loss of lift and an increase in the profile drag which is characteristic to this condition of airflow. The result will be a powerful rolling and yawing moments in the direction opposite to the one intended by the pilot. As a consequence, the plane will go into a spin; and if the altitude is insufficient, a crash will ensue.

There are a number of ingenious devices developed to warn the pilot of an approaching stall. In some devices warning is produced by a sound; in others it is accomplished by a considerable increase in the effort required to move the stick. These devices, however, do not really accomplish their purpose or achieve control of the situation and their usefulness narrows to a warning of an approaching stall which in itself is furnished by instruments.

### Lateral Control at Stall

Because of the importance of slow flying in landing, which is a deliberate approach to a stall near the ground,

(Continued on next page)

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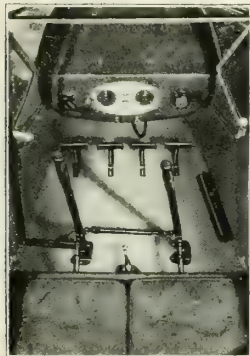




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(Continued from preceding page)

and more particularly because of forced landings and involuntary stalls, it became imperative that a remedy be found to counteract the faulty action of ordinary ailerons and their inefficiency at stalling angles. Through a methodical wind tunnel research, a series of wings were developed which by virtue of their profile could conserve (though they did not eliminate the burble point) the maximum lift through a considerable range of angles. Such wings permit rather efficient operation of ailerons at and below the stalling speed of the aircraft. They do not, however, remedy the undesirable yawing moment. To overcome the latter, a differential aileron control was developed and is being used quite successfully on a number of planes. The movement of differential ailerons is unequal up and down, the aileron moving in degrees farther up than down, thus decreasing the yawing moment on the side where the aileron was moved down and also minimizing chances of stalling the wing. Another device being used quite extensively is the so-called Frieze type aileron. It consists of an aileron with a hinge located at 18 to 25 per cent of its chord and near the lower camber of the wing, so that when the aileron is moved up, its leading edge projects below the wing and causes additional profile drag on that side.

The increase of drag on the lowered wing causes a moment about the center of gravity of the airplane which is opposite to the undesirable yawing usually set up by the ordinary ailerons. The Frieze type aileron can be made to operate differentially which renders its action still more pronounced.

Opinions differ as to the desirability of using Frieze ailerons because of the extra drag induced by them. It is often contended that an efficient rudder would offset the undesirable yawing tendency much more effectively and with less increase in drag.

### Landing Speed

The solution of the problem of decrease in landing speed and improved control at the stall have been sought in a number of other ways. Any device which increases maximum lift can, by being operated separately on two sides of the span, be used to improve lateral control. In a number of cases, however, it will be found that mechanical complications are such as to make it impractical.

### Slotted Wing

The most popular means of preventing the airflow from detaching from the upper contour is by deviating it in the desired direction by means of wing slots. This end is achieved by fitting at the leading edge a specially shaped auxiliary airfoil which when open creates a slot between it and the main contour. The beneficial effect of this slot can be partly explained by the venturi effect and the deviation of airstream due to the downwash from the auxiliary airfoil. The usefulness of the front slot can be increased further by fitting the airfoil with a trailing edge flap gear which when open also forms a similar slot with the central portion of the wing. This slot also naturally helps to prevent the detachment of the airflow.

The slotted wing was invented simultaneously by Mr. Handley-Page in Great Britain and Dr. Lachmann in Germany, and at present both are engaged in perfecting this gear. It seems that Dr. Lachmann is concentrating his efforts on developing the slotted wing as a means of increased speed range, whereas Mr. Handley-Page and his

(Continued on next page)



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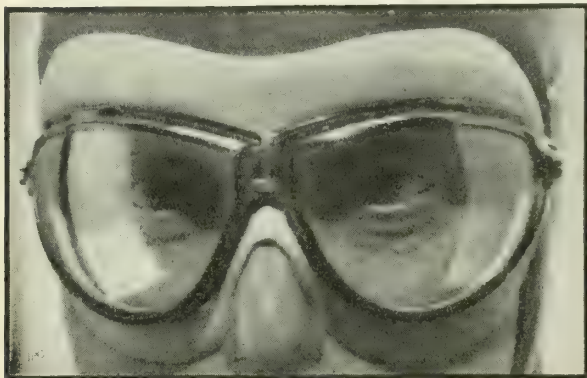
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(Continued from preceding page)

associates are working on it with a view of obtaining efficient lateral control at and below stalling speed.

The drawback of the slotted wing as it was first conceived and used was that it was operated mechanically in a manner similar to the action of an aileron. Since the device was heavy and sluggish to operate, mechanical complications developed. Only recently an automatic slot was developed obviating the necessity of any special operating mechanism. The auxiliary airfoil is located and mounted in such a way that the air pressure itself opens the slot at angles just preceding the stalled condition of the wing.

The automatic slot was still further improved in the United States by incorporating a simple locking device. When the slots are locked the operation of the plane is no different than if there were no slots. When the use of the slots is desired, the pilot pulls the release handle and the auxiliary airfoils are instantaneously free to operate.

The auxiliary airfoil is extremely sensitive and if the two slots are not adjusted with the greatest precision erratic and non-synchronous action of the front airfoil results. In order to prevent too early opening of the slot, the leading edges must be fitted so closely that even light cannot be seen through the joint.

## Spinning

Positive control in stalled flight is largely necessary to prevent spinning, the grave importance of which is fully realized by everyone because of the heavy toll of life caused by accidents due to spinning.

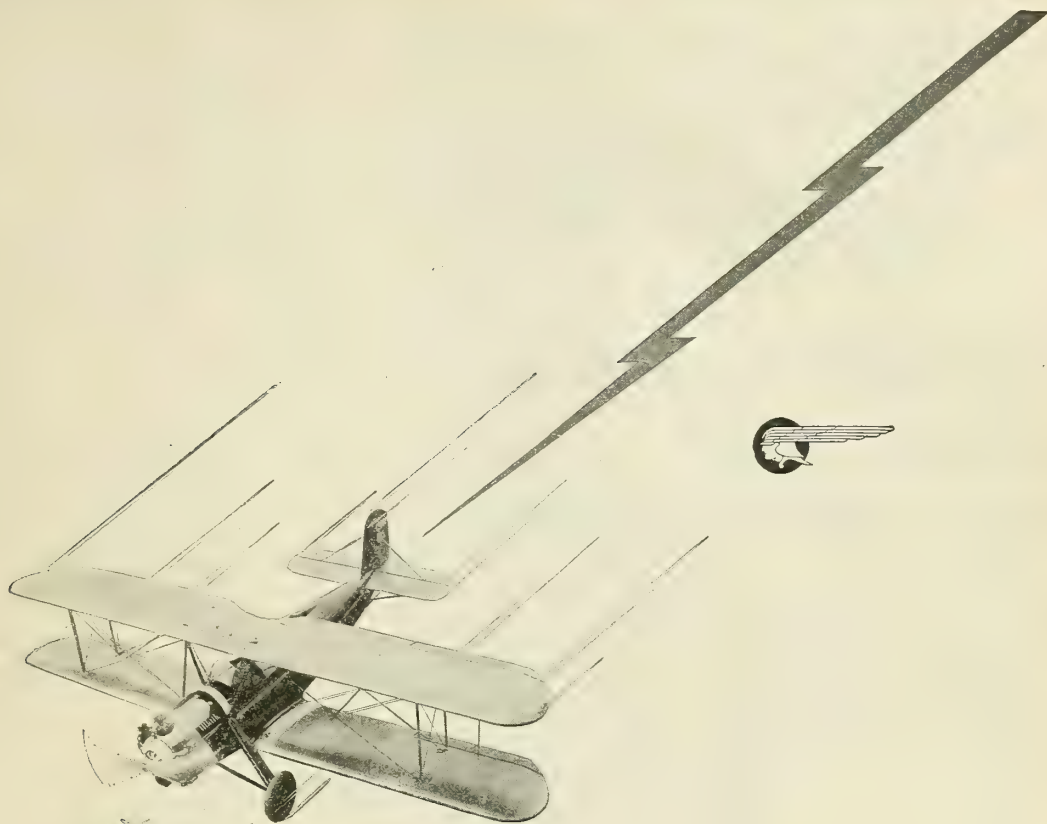
Although we do not yet possess definite data which would enable us to design airplanes entirely incapable of dangerous spins and although we do not now know of any means of a certain recovery from spins, yet recent tests and investigations have brought us closer to the solution of this problem by clearing away old prejudices and opening a new way of attack. The old aerodynamic theory of spinning suffered a severe blow when aerodynamically non-spinning monoplanes and highly staggered biplanes refused to obey their polars and kept on spinning despite the best efforts of their pilots to bring them out.

The most important results brought out by recent tests made in the United States indicate definitely that although the rolling couple due to auto-rotational tendency of the cell or a wing may contribute to the entrant motion, its effect in an established steady spin may be considerably smaller than the effect of the complete unit of wings, body and tail surfaces.

It was found that the characteristics desirable to retain ample control at low speed—flattened out lift curve beyond the burble point, large stagger and a forward location of the center of gravity—while desirable from the standpoint of prevention of incipient spinning, were insufficient to overcome dangerous spinning characteristics of certain airplanes which, once spun, showed a decided persistency to continue doing so.

As a matter of fact, it is generally agreed, and has been verified, that the plane which is hard to spin and has no tendency to fall into an incipient spin is hard to recover after a prolonged spin. Another important point observed by test pilots is that the spinning characteristics of modern planes, because of the general trend of design, are such that the altitude required for a complete recovery can be as much as 2,000 feet. Particular emphasis should be placed on the importance of the rudder control and efforts should be directed toward increasing its efficiency by preventing its shielding.

(Continued on next page)



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In Great Britain where spinning has been the object of long and thorough study, great hopes were entertained in the slotted wing. It was believed that the adoption of the automatic slot would prevent dangerous spinning tendencies and would constitute a powerful means of recovery.

Authentic experimental data on spinning tests with slot-equipped airplanes are unfortunately meager and contradictory, so that no definite conclusions can be deduced as to their value in recovery from dangerous spins. It has been established, however, that although they improve control at low speeds and, in case of planes having tendency to fall into an incipient spin, correct this dangerous characteristic, wing slots do not always prevent spinning. On one occasion of which I know, the pilot had considerable difficulty in recovering a plane from a prolonged spin despite the use of slots.

Inasmuch as the chief value of slots consists mainly in shifting the burble point into regions of higher angles of attack, which are yet below the angles corresponding to certain dangerous flat spins, the beneficial effect of slots can be disputed in the case of such spins. Since a commercial plane may fall into a spin because of unexpected and unforeseen forces, prevention alone does not constitute a solution and we must find a positive means of recovery for any plane and from any spin.

Fortunately, the problem of spinning has been stripped of much of its mystery and we are in a position to state certain characteristics which act as preventatives of incipient spins and others which are desirable to assure recovery from dangerous spins.

To prevent an incipient spin, the following conditions are of paramount importance:

- (1) Wing combination having no sudden decrease in lift past burble point.
- (2) Ample lateral control by proper design of the ailerons and wings. The Frieze type of ailerons and differential control are desirable.
- (3) Location of the center of gravity so as to give correct static stability for normal flying speeds.
- (4) Proper disposition of vertical and horizontal tail surfaces. The rudder must be effective for small displacements. To assure recovery from a dangerous spin, the first of the enumerated conditions seems to be detrimental, but the following characteristics were found desirable:

- (a) Large rudder area.
- (b) Small body cross section near tail.
- (c) Large aspect ratio of the tail, and powerful elevators.
- (d) Disposition of control surfaces as in flying boats, is believed generally desirable.
- (e) The center of gravity should not be located abnormally far back. The desirable location is not farther aft than about 37 per cent of the mean aerodynamic chord.

Some time ago I suggested that the effect of a front slot on the horizontal tail surfaces be investigated as a possible means of positive recovery from dangerous spins. Since spinning is a stalled condition aggravated by the presence of a powerful precessional stalling moment, the diving moment of ordinary tail surfaces is at times insufficient to overcome the sum of the two mentioned stalling moments. It is my belief that the front slot in combination with elevators acting as a rear flap gear may solve

(Continued on next page)

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You will find them available at nearly all airports throughout the Central West.



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324



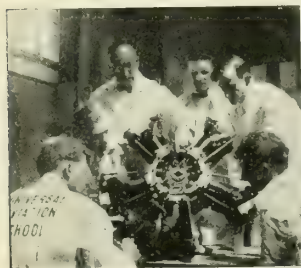


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A transport pilot flying tri-motor planes — working six pleasant hours a day — earning from \$5,000 to \$8,000 a year. Wouldn't you trade your job for his? You can if you only try. With proper training and experience you, too, can become a high salaried transport pilot.

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NO. 11102

(Continued from preceding page)

the problem of recovery. A forward inclination of the rudder axis may, and probably will, increase its efficiency at high angles of attack, thus rendering the rudder more efficient for the stalled condition of flight. I believe that mere increase in areas of stabilizing and controlling surfaces is not the best solution and that we must rather attempt to discard the standard allocation and disposition of the tail surfaces to combat the dreaded tail spin.

Spinning is at present an object of intensive study by scientists; the efforts and observations of pilots and engineers have brought us much nearer the desired goal than we were a few years ago and we may be assured of a final victory.

The airplane of today is much safer than would appear from a mere study of accidents, since in a number of cases the fault is not that of the machine but of the man at the controls or of those on the ground who do not help with their interest and resources to contribute to safety by development of ground facilities necessary for safe operation of aircraft. Government licensing of aircraft and engines, proper training of personnel, development of ground facilities and operation of airlines on sound technical and business bases will soon bear their fruits, and the man on the street will look up in the sky for his new way of travel.

### THERE IS A SANTA CLAUS

(Continued from page 53)

before, the thing was infectious. It even found its way into the great American home and sat down at the dining table. Wives and mothers who had never gambled on anything more uncertain than a huckster's cantaloupe went all ticker-tape and learned to gossip like the Wall Street Journal. I would come home, for instance, from a hard day at the office and make a perfectly innocent inquiry. "How have the children been today?"

"Well," says my wife, "the boys were bearish on dishwashing this morning, and domestic utilities found very little support this afternoon. There was a sharp break in dishes when I left the baby to hang out the wash, and there has been a good deal of raiding of the cookie jar."

"Did everything else go well?" I ask hopefully.

"Not very," says she. "Liquidation continues in the laundry tub spigots, and you should really call in a plumber. The ticker in the living room is thirteen minutes late. I had quite an argument with the huckster; he's selling short on potatoes again and fish are a little off. Money has been tight all day, with very little support from the banks. There's a weak tone to the radio and coal stocks are at a new low level. Call money was in demand all morning, what with the installments on the piano and the gas man. It's been a hard day."

"Maybe things will be better tomorrow," I suggest cheerily.

"Maybe," she replies. "But you'll have to let me have more margin. If you don't leave me at least five dollars in the morning, you'll get nothing but baked beans for supper."

That, you see, is what happened to us all when this fat country became "Wall Street conscious" instead of attending strictly to business. We just went ticker-tape. We began to talk of business in terms of stock quotations instead of figuring it as profit and loss, production and consumption, and the merry ringing of the cash register. And in the natural course of events, aviation went ticker-

(Continued on next page)



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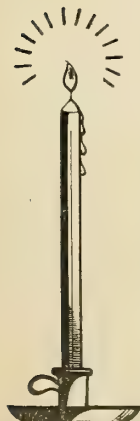
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Titanine-finished airplane surfaces are safeguarded against this injurious spray. Even when the evaporated spray turns into grinding salt crystals, Titanine-doped surfaces present no minute cracks for the particles to enter and break down the fabric with their corroding action.

Titanine dopes assure a tightly drawn surface. Their high covering power makes them practically free from any tendency to brittleness and unusually flexible after application. They strengthen airplane surfaces against the strains and stresses of harmful elements and weather extremes.



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REGISTERED TRADE MARK

## TITANINE, INC.

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STANDARD AIRPLANE FINISHES SINCE 1913

(Continued from preceding page)

tape also. Too many of its friends and followers began to be less interested in pay loads and overhead than in flying kites and buying and selling the bright blue sky. And when the lift went out of the market, some of the air stocks came down fast and far.

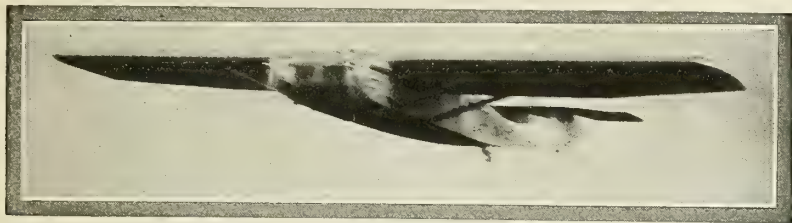
They won't go up again as quickly as they came down. Some of them will very likely never go up again, for the reason that their aerodynamics are unsound and they can't ride any longer on the slipstream of the good ones. But one of the surest bets in Wall Street, which is a place where one bet is as bad as another, is that the good aviation stocks are the best investment buys on the board today. Which are the good ones and which are the flops is more than I can tell you, but among the crop are those enterprises whose history will parallel what happened in rails and motors and half a dozen other money-makers. For this is a new industry, a new utility, a new opportunity for unlimited growth and expansion. Its future is as big as all outdoors and the foundations of that future are already laid. Anybody who buys a brick which properly belongs in these foundations, and holds on to it long enough, will have staked a claim on a golden future.

Which are the good ones? Don't ask me. Only once in the memory of man did I ever buy right for a rise, and that was just last week. Right in the middle of the bad weather on Wall Street I discovered something which was at 50 when I picked it up and went to 76 inside of a day. It was a thermometer. But aside from that, nothing in my experience qualifies me to pick the winners among the aviation stocks. And I don't believe anybody else can do it much better. Certainly the greenhorn who buys on advice, and nothing else, is looking for a licking. He's buying a pig in a poke and it's not even his own poke.

There seem to be two good ways to choose your own poison in the market, so far as aviation stocks are concerned. One was told me by a man who has the money to play his own tip, which is more than I have. This gent remembers the old story about the risk of putting all the eggs in one basket, and takes a slice of eight or ten of the best-looking propositions on the board. Then he puts them away and forgets he owns them. He figures that in the course of time most of them will be nothing much but wallpaper, but one or two will have come through handsomely enough to pay for the works and a profit besides. The other method is to treat aviation investments with at least as much sense as most of us would apply to horse-racing. We don't as a rule put our pocket-money on a nag's nose unless we are sure that the beast has four legs, a sense of direction, and some share of ambition and good intentions. We ought to buy into this business with the same discretion. We ought to figure the men and properties behind the proposition, the history of its management, and its present and potential earnings. When we have done all these things, we may still be wrong, but at least we won't be suckers.

Maybe the market slump did some good if it trimmed the suckers off this business of ours. Maybe it will be worth the price if it puts a stop to the "aviation racket," which was hurting the industry worse than all the pessimism of the prophets of gloom. Maybe the professional promoters got a black eye big enough so that the public will recognize them when they come round next time to sell shares in pipe dreams and wildcat airports, airlines and manufacturing mergers. Maybe we needed this lesson, even though we don't like it.

(Continued on next page)



The Chapman Air-liner, with landing gear retracted, in flight. Designed and built by V. J. Burnelli.

## Some Of The Outstanding Advantages Of The Burnelli Type Are:

Power Plant Accessible While In Flight, Reduction of Head Resistance, Fuselage Lift, Decreasing Landing Speed, Increased Cabin Space, Reduced Turning Moment On One Engine, Practical Landing Gear Retraction, Structural Simplicity, Efficiency, and Rigidity.

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**T**HINK how many "gripping" jobs come up in the course of your regular work—and what it would mean to you to have ONE tool to take care of practically ALL of them!

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And remember, Angle-Nose Grippers are not made of open hearth steel that's merely surface hardened or "case hardened," but from our own laboratory formula special alloy steel, hardened and tempered ALL THE WAY THROUGH TO THE CENTER. That's why this and other Vacuum Grip Pliers are unequalled for strength and durability, outlasting several pairs of ordinary pliers.

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## VACUUM-GRIP ANGLE-NOSE GRIPPERS

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\$2.00

### A CHRISTMAS SUGGESTION

Give your best "Pal" a pair of these handy grippers for Christmas—or drop your folks a hint to include them in the list of "useful gifts" for yourself.

Your name or your friend's name etched FREE on handle.

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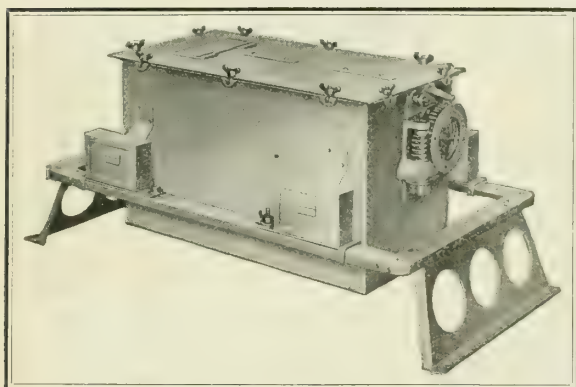
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# AIRCRAFT BEACON RECEIVER

## Model AR 1286

*Can be operated from the cockpit or any other desired location on the plane because it is remotely controlled. It operates on a six-foot vertical antenna.*



**F**AR greater safety in flying is now assured . . . through the development of this reliable, lightweight, remotely controlled Aircraft Beacon and Weather Receiver.

The Radiomarine Corporation has perfected this device in an effort to keep pace with the vast radio program of the Airways Division of the U. S. Dept. of Commerce.

Transport operators and private fliers report that this receiver gives uniformly satisfactory results . . . Every plane equipped with this receiver possesses a much greater margin of safety . . . and is also better able to maintain definite time schedules.

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*(Continued from preceding page)*

And maybe there's a Santa Claus after all, even though the Guggenheim Foundation has shut up shop and gone to Cuba. It looked for a while as though none of us would be hanging up our socks this Christmas, partly because of the holes in their heels and toes and partly because nobody had anything to put in them. Enterprising manufacturers were contemplating putting out a nice line of tin cups and pencils as Christmas gifts for the lambs who were shorn, skinned and horn-swoggled when the market went blooey, but aside from that it looked like a lean season.

But it seems that there is a Santa Claus. Right on the heels of the worst and first inverted altitude flight of aviation securities, comes a chorus of good news and encouragement. Just for example, we hear this week that exports of aeronautical goods during the first nine months of 1929 not only broke all records but were almost double the total exports of 1928. Fifty-nine per cent of the total went to South America, which makes a nice dividend on the goodwill flights and pioneering in mail service which seemed like a waste of time and money to the timid souls. About four million dollars' worth of good clean business is something. It's more than that. It's part of the answer to the problem of overproduction, which has been keeping some of our best people awake nights during the past six months.

This nation built better than six thousand aircraft during the past year. It seems to have been a few too many. For one thing, an airplane lasts longer than it used to, even though it works harder. For another, it takes a great deal less time to build a plane than it does to train a man to fly it. For a third, you can double and treble and quadruple the output of the factories much more easily than you can find places for so many airplanes to sit down. So overproduction is something to think about. But if a whole continent, designed by nature and improved by man to be the world's choicest territory for air communications, can be persuaded and encouraged to make this the source of supply for planes, parts and motors, there will be business enough to take up all the slack. And that's something to find in the bottom of a Christmas stocking.

Here's something else. Major General James E. Fechet has just spoken right out in meeting to the effect that Congress has got to spend more money on the Army Air Corps if it wants the five-year program to amount to anything. He spoke of the need for more men, machines, hangars and equipment in general. It took nerve to do it, in the face of disarmament discussions and the pain-in-the-neck pacifists, but the General never lacks the courage of his convictions though he chooses his time for stating them. The statement was an excellent antidote to the one by General Smuts of South Africa, who talked on Armistice Day to the peace commemoration dinner of the League of Nations Union. The general, who is a wise and honorable man, argued that aerial disarmament was more important to European peace than the trading and scrapping of navies, which won't amount to much anyway in the next war. He was right, but he wasn't talking about us. No one has yet had the impudence to say that our aerial armament is adequate to our coast lines, our national wealth or our national needs. It isn't so for the present, and it certainly isn't so for the day—may it be a long way off—when some hungry or jealous or ambitious nation will try to drop calling cards on our seacoast cities.

*(Continued on next page)*



Largest and Smallest Edo Floats

**EDO EQUIPPED**

(List revised to November 15th, 1929)

- \*AEROMARINE-KLEMM
- \*ALEXANDER EAGLEROCK
- \*AMERICAN EAGLE
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- \*STANDARD
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- \*SWALLOW
- \*STINSON SM-1F
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- \*WACO 9
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\*Licensed by the U. S. Dept. of Commerce as Edo-equipped seaplanes.

## A Plan That Offers Airplane Manufacturers Extra Sales with Added Profits

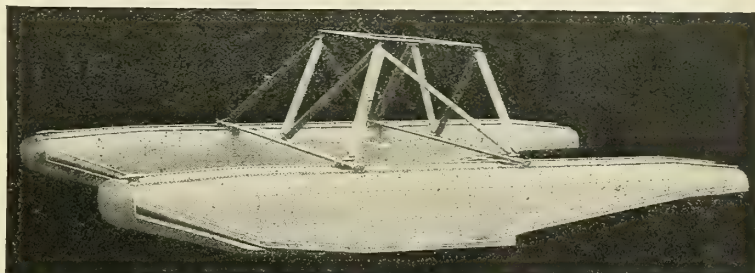
This year seaplane sales have grown several times as fast as land plane sales. Water flying promises to be more popular than ever in 1930.

The EDO sales plan offers the manufacturer of land planes a practical and inexpensive way to take full advantage of this rapidly growing trend. It opens up a virgin prospect list, insures increased profit per sale and protects the manufacturer and his distributor.

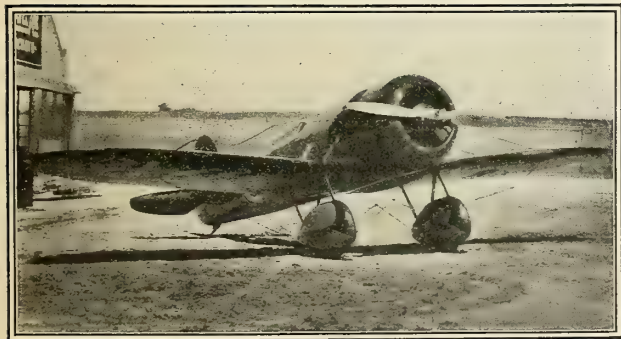
Complete EDO Float Installations, interchangeable with wheel landing gear can be furnished to manufacturers of all classes of land planes up to 8250 lbs. gross load, in accordance with United States Department of Commerce regulations. To date thirty-eight types of planes have been equipped with EDO all metal float installations. Manufacturers who have tested the EDO sales plan use these installations as standard equipment and are enthusiastic over the results obtained. EDO offers fullest co-operation and complete facilities to other manufacturers who wish to profit by the growing demand for planes with EDO Float installations. For particulars address Edo Aircraft Corporation, 610 Second Street, College Point, L. I.



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This fact is in line with the past performance of this blood-albumin glued plywood . . . practically every record breaking and holding plane in this country has been equipped with it. And its superiority is further attested by the number of aircraft manufacturers regularly using it—over 85%. Write for engineering and other data on HASKELITE.

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NB ARMY-NAVY No. 1—Made of heavy grade Jungle Cloth, lined with best South American Electrified Lamb-skin.....\$140.00

NB ARMY-NAVY No. 2—Same as above, except lined with heavy sheepskin wool.....\$120.00

(Flying Suits supplied in all sizes, 36 to 48)

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NB ARMY No. 1—Chocolate leather sheepskin wool lined. Extra heavy.....\$5.00

NB ARMY No. 2—Tan leather, soft fur lining. Heavy weight.....\$6.50

NB ARMY No. 4—Chocolate leather, heavy chamois lining. Medium weight.....\$4.00

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NB NAVY No. 3—Imported capes. Chamois lined, with powder puff ear pads.....\$6.00

NB NAVY No. 4—Chocolate cape. High quality chamois lining.....\$6.00

No. 1498—FACE MASKS. Finest imported leather. Removable mouth piece. Protects entire face and chin. Permits free breathing.....\$4.00  
No. 1496—Leather Face Mask, designed for use with Meyrowitz No. 6 U. S. Air Service Type Goggles. Recommended by air-mail pilots.....\$3.50



## SCULLY HELMETS

No. 94—Cordovan Cape, beaverized lamb's wool lining. Exclusive wind-tite features.....\$10.00

No. 92—Cordovan cape, grey suede, leather lined, with wool inner lining.....\$7.50

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## MOCCASINS

WS1—War Surplus, tan elk leather, heavy sheep wool lined. Three buckle fasteners. Slightly shopworn.....\$6.00

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We have by far the most complete and largest stock of OX5 Motor parts ready for immediate shipment on your order. Give your motor a good overhaul this winter so it will be ready for flying in the spring. Our prices are right.

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604 Broadway, Kansas City, Mo.

(Continued from preceding page)

The extension and strengthening of our aerial defences is a legitimate and necessary and commonsense part of our national program, and the fact that the aviation industry will profit by such a program is no argument against it. If the Senate thinks I'm lobbying when I say so, the Senate can go fly a kite. Better still, the Senate can go argue with General Fechet and see where it gets off.

So the Christmas stocking holds a hopeful prospect of a construction and development program for the nation, which shouldn't hurt the feelings of the manufacturers, designers, inventors, and hopeful young students at flying schools.

Finally we find in the stocking a record of achievement in airport construction which is the real hopeful sign of good times coming. For with all the air there is in the world, aviation can make little use of it until it is mapped and routed, laid out in trails and highways, lit by night and focussed on terminals of business. All this means airports. The automobile reached the peak of production and utility only when hard roads were laid across the continent. Rails must have terminals, ships must have ports. And likewise the airplane must have airports, or else it has nowhere to go and nothing to do when it gets there. I haven't on hand the totals of the nation's investment in airports, and you wouldn't believe them if I did, but what was spent this year on this little item makes a nice little Christmas present for the industry and proves conclusively that there must be a Santa Claus.

If you want to fill up the corners, you can stick in such trifles as the new radio beacons, the gyroscopic controls, the devices for blind landings, the increase in mail traffic, the passenger totals for the year, the reduced insurance rates, and the growing popularity of coordinated transport by air, rail, water and roller skates. But the stocking is full anyway. And there is a Santa Claus.

Somebody should have said this to the banker or broker or trader or sucker who was seen running down to a dock on the Hudson, his coat-tails flying in the wind and his hair all wild and distraught. There was a crowd of people on the dock and a policeman. The policeman stopped him. "Where do you think you're going?" say he.

"Down to the dock to jump in,—to commit suicide," says the gent. "I'm ruined, wiped out, busted. Let me go!"

"Hell, no," says the policeman. "Get in line there and wait your turn."

Well, it's been a tough time, but there's no reason for jumping off the dock. The country is sound and so is our business. And if we put our minds to it we can still wish each other a Merry Christmas and mean it.

## THE FIRST COMMERCIAL AIRLINE

(Continued from page 59)

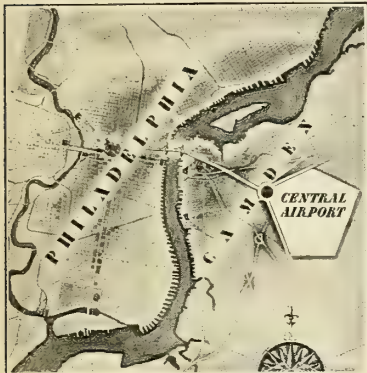
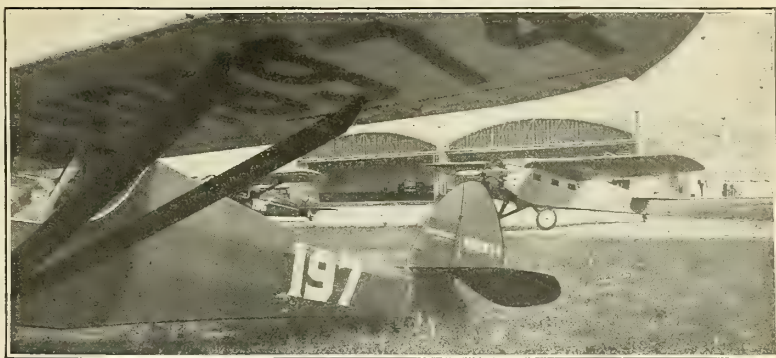
"Here she comes!"

Then the watchers saw the speck in the eastern sky, and saw it grow in size. Tony never did fly high, and coming home that trip he came in at about 500 feet, circled the basin and settled to one of his characteristic landings. He drove up the slide and the crowd went wild. Tony was a hero that day, yet only his flashing smile showed that he appreciated the plaudits.

That afternoon there was another round trip, and then we settled down to routine flights—at \$5 a head. Our agreement with our backers permitted us to indulge in

(Continued on next page)

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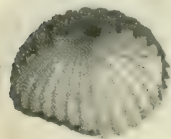
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COMPANY**

TRENTON, N. J.

(Continued from preceding page)

"special" flights at any price we cared to name, and we made a number of these trips at \$10 to \$20 each. But always we had in mind the scheduled flights, and I am not ashamed of our record.

Just the other evening, in looking over some old papers, I came across a copy of the timetable that had been hastily printed. I accumulated, during the operation of this line, nearly a thousand clippings from newspapers and magazines, intending to pass them down to my boys. The entire lot was stolen from my desk during the war. I had saved a dozen of the timetables, never dreaming that, sixteen years later, almost exactly similar sheets would represent the practice of that day. Many and many a time since the war I have said that I'd give a twenty-dollar bill for one, and at last I have it. I'd like to know if there is another left.

Among the few papers I have bearing on the operation of the line is one giving the record of flights in January—the first month. We flew every day of the first and last weeks of the month. We missed only Friday from the second week. The last three days of the other week were blanks, because of bearing trouble. That's not a bad showing, when we consider the equipment and the conditions. I found this record in a monthly report to the backers of our project, which reads as follows:

"Florida Bank & Trust Co.,

St. Petersburg, Florida.

February 9th, 1914.

Gentlemen:

Summing up our weekly reports for the month of January, we beg to hand you herewith, a condensed statement of operations in accordance with the terms of agreement between us and certain subscribers to a guarantee fund.

Date	Round Trips	Date	Round Trips
1/ 2/14	1	1/15/14	2
1/ 5/14	2	1/17/14	2
1/ 6/14	1	1/19/14	2
1/ 7/14	1	1/20/14	2
1/ 8/14	2	1/21/14	1
1/ 9/14	2	1/26/14	1
1/10/14	2	1/27/14	2
1/12/14	2	1/28/14	2
1/13/14	2	1/29/14	1
1/14/14	2	1/30/14	2
		1/31/14	2
			36

This is equivalent to 18 days actual flying in accordance with our agreement. We carried passengers on every trip.

The following statement shows the amount due under the subscription agreement.

18 days actual flying @ \$50.00.....	\$900.00
Credit a/c passengers carried 18 days @ \$20.00	
(4 single trips @ \$5.00).....	360.00
	<hr/>
	\$540.00

Very truly yours,

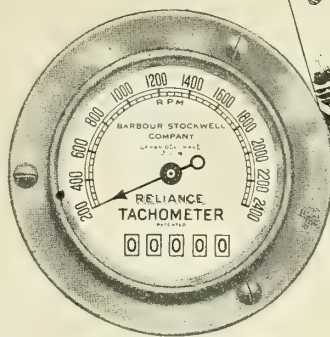
P. E. FANSLER

St. Petersburg-Tampa Airport Line."

Tony had absolute control in regard to flying conditions; if he said the weather was too bad for flying, the trips were canceled. I believe that he exercised rare judgment, and only twice during the season was he forced down with engine trouble. One of these forced landings demonstrated his skill as a flier. He had skirted the shore as usual, but

(Continued on next page)

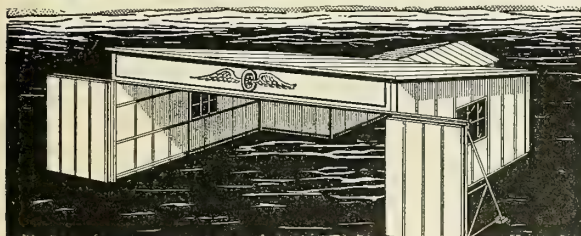
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- airport beacons;
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(Continued from preceding page)

had swung to the north to make the crossing of Old Tampa Bay where it was narrowest. The engine had been objecting to some dirt in the gas, and it became absolutely necessary to drop down and clean the carburetor. Landing in a short, choppy sea, Tony smashed one pontoon and one lower wing section. After calmly cleaning the carburetor, he got the boat into the air again with consummate skill, and flew on in, with a portion of the wing hanging like the broken wing of a bird. He landed, helped the passenger out and, in reply to Tom's hearty praise, lighted a cigarette and passed it off with:

"Hell, whatcha talkin' so much about. That was nothing."

We had a waiting list a yard long, and not once during the season did we fly without a passenger. Frequently Tony would say to me:

"Son, we need another five spot. Load 'er up," and we would let one light passenger sit on another's lap. It was a load for the old bus, but it doubled the income for that trip. Once Tony came in from Tampa with two passengers, tourists, with their suitcases strapped in a pile behind him.

A clever advertising stunt was pulled by the advertising agent for a prominent packer who happened to be in St. Petersburg. One morning a local butcher called the hangar and asked if he could have an express shipment of fifty pounds come over on the next boat. I told him he certainly could, and when the boat came in I wasn't there to see a photographer slip out and get some pictures of the package being taken from the boat. About six weeks later a full page advertisement appeared in *Collier's*, featuring the delivering of Swift's bacon by flying boat. The story was told, in text and picture, of a particular customer of the St. Petersburg butcher who just couldn't get along without some Premium bacon. The butcher had none, but agreed to telephone to the distributor in Tampa and have some expressed via air boat. Of course the photographer recorded the loading, as well as the landing, and it made a very interesting ad—I believe the first express shipment of any size by a regular commercial airline.

Of course the St. Petersburg papers were making the most of it. We had front-page stories in the morning and evening papers. An itinerant flier appeared in Miami, then a keen rival of the west coast Florida resort. A Miami paper published a story of this "jazz" flier, under the caption "Miami Has An Airplane Too." Archie Dunlap, the clever city editor of the St. Petersburg *Independent*, reprinted the item in a "box," with his own head over it reading: "Ours Flies; Does Yours?"

In spite of the fact that I was in the Bureau of Aircraft Production for almost the duration of the war, I don't believe I ever noted a well-known characteristic of army officers more typical than one that came to my attention at St. Petersburg. Ray Morris came down with a beautiful Curtiss monoplane flying boat—the first monoplane, I believe, built in this country. Naturally it was much faster than old 43, but its motor was as temperamental as an opera star. As I remember it, the Army wanted some data on flying boats and detailed two officers to come to St. Petersburg and report on the Curtiss boat.

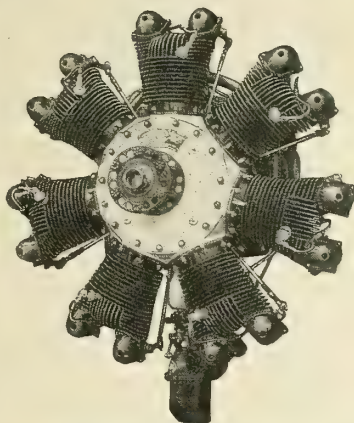
One morning these two officers appeared in the hangar that had been built next to ours for Morris's boat. Down they sat, in comfortable chairs, tilted back against the wall, only five feet from our wall. Ray and his mechanic were tinkering over the recalcitrant motor. It wouldn't turn

(Continued on next page)

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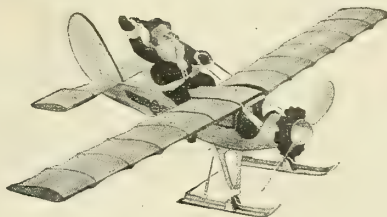
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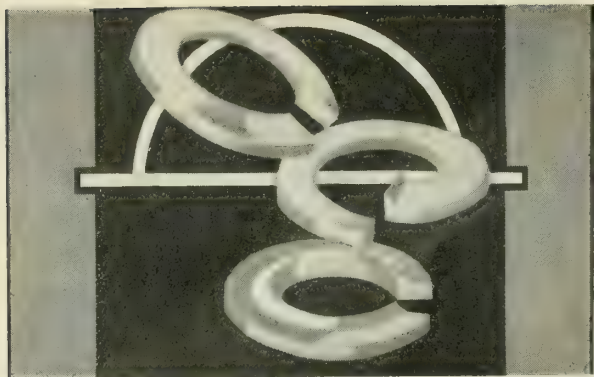
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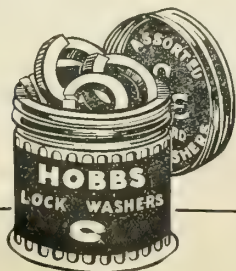
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*(Continued from preceding page)*

over. From time to time Ray would come over and explain that the trouble would be rectified in half an hour. Lunch time came, and the officers went to town for an hour. The afternoon was a repetition of the forenoon. The next day passed as had the former. That night, acting on orders, the army men departed. Ray had not been able to get his boat into the air. During the two days Tony and Roger had made more than a dozen flights with passengers. Yet not a word or a glance from the army officers indicated that we were in the same world. I felt quite certain that some real data on commercial aviation, *a la* 1914, could have been secured had the Army been able to look over the edge of its orders.

Tony had some advanced ideas regarding constructional details, and we all were constantly itching to try these and others of our own brewing. Nearly every type of plane in that day sported as much wire as a grand piano, and Tony wanted to see all the struts and wires replaced by one big streamlined strut. We had little knowledge of airfoils or of any of the aerodynamic principles, and we constantly came across phenomena that mystified us. Tony claimed that, when he came down close to the water, when it was glass-smooth, the speed suddenly "jumped" several miles an hour. He evolved the theory that, at a certain height, a sort of air roller was formed that increased the velocity of the plane, and that, at slightly greater or less heights, turbulence retarded it. Inasmuch as I had dabbled in photography for many years, I wanted to set a line of smudge pots on the water, fly the plane over it and take photographs showing the air disturbance. But such crude experiments cost money, and there was just about enough of that to keep the gang from being hungry.

At that time the Atlantic Coast Line Railroad carried through passengers from the North from Jacksonville to St. Petersburg, while the Seaboard Air Line (No, it wasn't an aerial transportation line, as its name seems to indicate) ran from Jacksonville to Tampa, and its passengers had to ferry to St. Petersburg on a dinky little steamer that could hardly get out of its own wake.

Consequently, I began negotiations with the Seaboard officials looking to the issuance of a joint ticket—rail from northern points to Tampa, thence by St. Petersburg-Tampa Airboat Line to the Sunshine City. Had the officials been possessed of one iota of vision, we would have antedated the modern air-rail lines by nearly two decades.

I also attempted to interest Post Office officials in the transportation of mail by air between the two cities, but aside from the postmaster in St. Petersburg, there was no one who could picture the U. S. Mails attaining such speed.

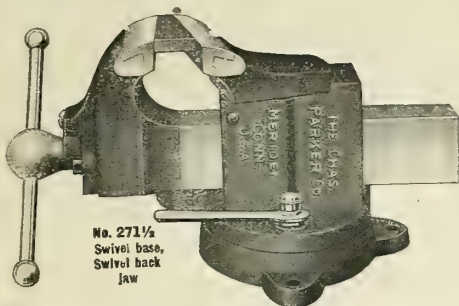
From the first I kept account of all expenditures and evolved some significant figures showing operating costs per passenger mile and per ton mile. I rather imagine that we had the only data available on that subject. Unfortunately, these figures have been lost. We segregated the costs and proved that commercial aviation was possible, even in that day, and with the limited carrying capacity afforded by the best design. Early that summer I started to form an honest-to-goodness air transport organization, but there was so little real money available in Florida that it was impossible to put it over. I still have the prospectus.

Tom had designed a twelve-passenger boat and planned to build it in time for the next season. He actually did complete the boat, and it demonstrated its carrying capacity. But it was wrecked, and there was no Guggenheim or similar beneficent force in that day to lead the struggling child.

*(Continued on next page)*



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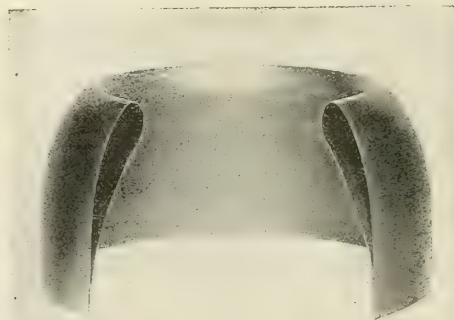
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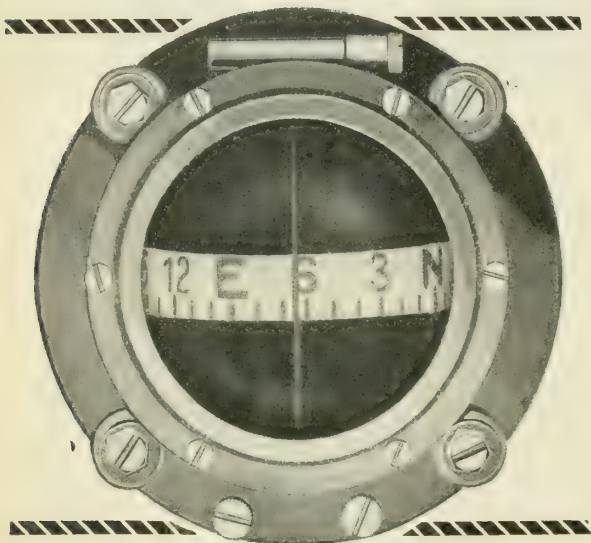
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## EMIL DAIBER

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CLEVELAND, OHIO

(Continued from preceding page)

Then came the war, and all our plans were disrupted.

Tom met an unglorious end. He had learned to fly through watching the buzzards in his native Ozarks. No one taught him to handle the controls, or coached him to the point of his first solo. He first took off with a motor that could hardly lift his crude ship into the air. His final flight was from a prosaic street car in Sandusky. He leaned from the window to wave to a friend and was instantly killed by striking a telegraph pole. Tom had many friends and, I believe, many who failed to appreciate what lay behind his frequent brusqueness. He and I never had a business difference on any account, or a difficulty, although there was nothing but a verbal agreement between us. He was the soul of honor; his word meant more to me than any legal document that could have been drawn up. Tony went West in Russia.

I have been led into these reminiscences through several forces. Several years ago a series of articles in the *Saturday Evening Post* exhaustively covered the history of commercial aviation and the then status of passenger carrying. In its opening paragraphs credit for the first commercial aviation line was given to Great Britain—to Aircraft Transport and Travel, Ltd. I am not anti-British, but I see no reason for giving credit to a foreign line that started three years after ours. The same kind of inaccuracies have persisted; for instance, in the new edition of the *Encyclopedia Britannica*, the earliest commercial airline mentioned is one organized in Europe after the war, the line having begun operations in September, 1919, between Paris and London. The final happening was the finding of a box of negatives taken that January 1st, 1914, and during the next days, and of a package of papers, reports and a single copy of the timetable. These excited the interest of the editor of *AERO DIGEST*—hence this tale.

### AIR—HOT AND OTHERWISE

(Continued from page 64)

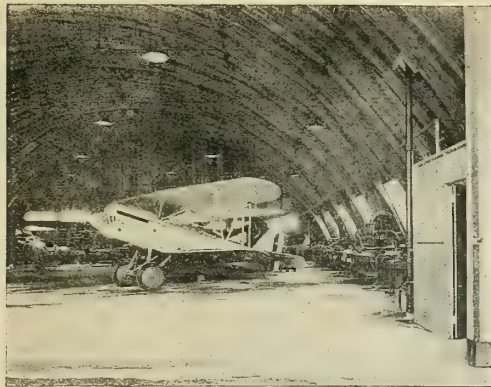
stopped. He says the revelations would astound the country.

We of the air game are accustomed, Tom, to doing that, but not in the way you mean. Hill is about five years late with his suggestion.

Maybe Hill was serious, but we cannot resist the thought that what he really wanted was publicity for his Society for the Prevention of Cruelty to Aviators, or whatever it may be. And as for Senator Bingham being the mouthpiece of the air lobby—why, when Tom brings that cruel charge against us real air lobbyists, he breaks our hearts. Tom. . . . Tom. . . . our judgment is far better than any that could do a thing like that. Not Senator Bingham, nor Senator Heflin, nor even Humpty Dumpty is our mouthpiece, Tom. I'll go further—you're not. That makes our safety almost utterly complete. But, anyway, nobody, since the first day's splurge in the newspapers, has paid much attention to Tom's vaporings, in general or detail. Tom got his publicity, the papers a few sticks of fillers, and the industry a laugh. And that's the end of that.

**A** MORE important subject is the annual dinner given by Aviators' Post No. 743, of New York. The guests were the Chief of the Air Corps., Major General James E. Fechet, Hon. J. Griswold Webb, chairman of the New York State Aviation Commission, Roger Williams, Captain Yancey, Captain Eddie Rickenbacker,

(Continued on next page)



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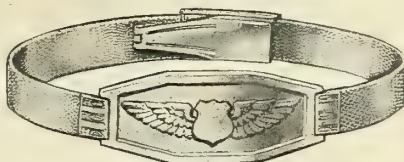
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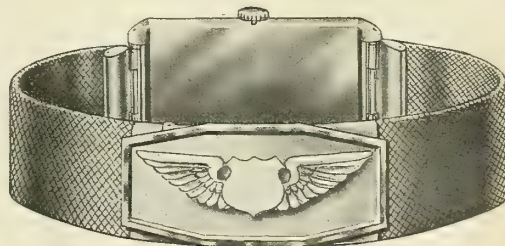
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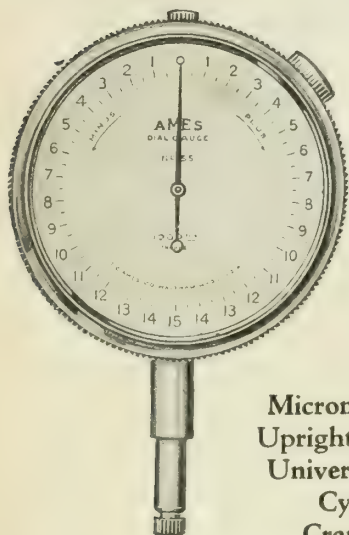
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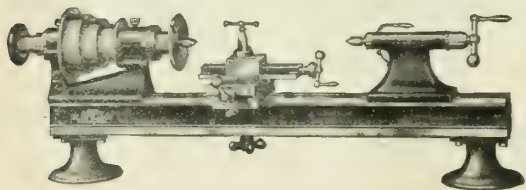
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(Continued from preceding page)

Elliott Springs, Captain Roy B. Brown, who shot down Richthofen, and oh, what's the use? To name them all would be to write a roster of every branch of the United States services during the large quarrel Over There.

Anybody doubting the safety of the United States would have had his doubt painlessly extracted without gas (other anesthetics were supplied) by mere attendance at this dinner.

Among the guests, one highly honored by the crowd, was Walter Rahman, who was cracked across the base of the spine in 1927 while flying as a commercial pilot and whose hard luck the boys with fine fellow feeling have taken up. He ought to get a chance at Warm Springs Foundation, down in Georgia. That would be the ideal place for him. The boys have tried, but so far haven't managed it. If we can help in any way we shall be mighty glad to.

Anyone who had the luck to see these boys at midnight on the great occasion could not fail to reflect solemnly upon the circumstance that as long as we have such as these we really do not need battleships.

Commander Dwight Sullivan acted as toastmaster and earned a Congressional Medal of Honor by his handling of the job. He won't get it on that basis, but he's likely enough to find it some other way.

### EFFICIENCY, KEYNOTE TO PROGRESS

(Continued from page 80)

of detail; and like other modern types, it enjoys the benefits of the newer Wright engines.

But when one design can lead the field for efficiency through eight years, the conclusion is obvious that—if the participants of America's two leading efficiency contests have been at all representative—airplane building in general has been pretty much at a standstill since 1923 so far as aerodynamic design and efficiency are concerned; unless we are to assume that the racing rules have been grievously defective, which would seem absurd. The safer bet is that many planes have been built almost regardless of efficiency. There is much in recent and current practice to indicate that American builders have been unfortunately diverted from this issue by the demands of high-pressure "sales experts" and investing capitalists for speed at all costs, or alternatively for superficial details purchased at the cost of too great a loss of efficiency. The public has probably been diverted by the same people to a similar demand, and aircraft builders by and large have been too busy "pleasing everybody" to give greater concern to the downright problems of efficiency.

Here is a condition which, if this analysis is even partly correct, ought to receive some tall thinking. It cannot be answered merely by repeating the usual fallacies about speed. It is unquestionably true that speed is the all-over objective of air transportation, but speed—in commercial operation, at least—is desirable only in terms of safety; and safety can be reasonably assured in our present-day types only by that reserve of performance which is the direct and consistent result of airplane efficiency. Despite the indifference, fallacies and handicaps discussed, real progress has been made and recorded in the promotion of efficiency by the Detroit News Trophy and the Aviation Town and Country Club Trophy events, but through the proper encouragement of these and similar efficiency and reliability contests, much remains to be done as incentive to the interest of both the public and the aircraft industry.

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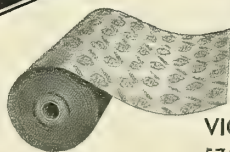
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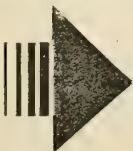
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## WITH AN AERIAL CAMERA IN MEXICO

(Continued from page 67)

darkroom work for three weeks, during which we saw one excellent photographic day after another go by with our plane still under guard.

Our organization, the Fairchild Aerial Surveys, Inc., leaves no stone unturned to see that the pilots and photographers utilize every moment of the infrequent clear days when high-altitude work may be attempted. As day after day went by with no reports from us, and the weather maps showing excellent photographic weather in our region, the New York office began to wonder what we were doing down there. Imagine my embarrassment on receiving a very pointed message from our vice president, Mr. E. R. Polley, who sat at his desk 3,000 miles away from the scene of operations, wanting to know the explanation of the non-arrival of our daily flying reports. My reply was to send him a picture of the grim-faced soldiers surrounding the plane. There was no comment.

This condition continued for about three weeks, during which time we were enabled to catch up with the huge piles of film which lay undeveloped in the darkroom. It meant starting at 7:00 a.m. and continuing until 10:30 p.m. with a short siesta in the middle of the day; inventing appliances to reduce the temperature of the water from about 92 degrees, at which it came from the pipe, to about forty; sweating under a hot electric lamp while doing our various chores, and keeping the lines of communication open between the ice house and our film supply, which must be kept very cold until used. There was no big laboratory to which to turn over our film; there were no aids in the form of efficient equipment and labor-saving devices.

Of course, we took no part in the conduct of the revolution, although we were in the thick of it in the isolated interior. We suffered no particular inconveniences excepting the loss of our plane, and I take this opportunity of stating our appreciation of the courtesies and protection accorded us by the federal army at Manatitlan.

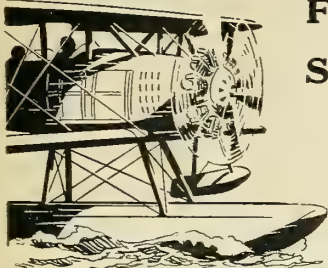
When the plane was released from custody, we continued with the work of making the survey, completing the 1,500 square miles in five photographic flights. The flights had to be made over this mountain and jungle country in strips of fifty miles long and three miles wide, enabling us to achieve a fifty per cent overlap on each side of the strip.

To those who believe that aerial photography consists of holding the camera over the side of the plane and pulling the trigger, a few weeks' experience in territory of this kind is an eye-opener. In April we went down to Merida, Yucatan, and took the first aerial pictures of the ancient ruins of Usmal and Chichen Itza, remnants of the long-departed Maya civilization. The whole territory in that part of the country is solid volcanic rock, which absorbs the best of the sun and creates such chaotic air conditions at low altitudes that flight of any kind is almost impossible.

In securing photographs of these ruins, some of which are reproduced herewith, we struck an air disturbance of such intensity that the forty-pound camera was knocked up into my face, breaking a tooth and depositing me on my back on the floor of the cabin with the camera on my chest. The extreme variations of temperature encountered in this work are a great strain on the photographer's constitution, involving a take-off in heavy flying clothes while the ground temperature is around a hundred and five; climbing rapidly to 15,000 feet where the thermometer registers less than zero. When the ship returns to the ground, the engine and all other metal parts, including the

(Continued on next page)

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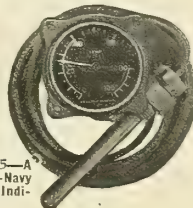
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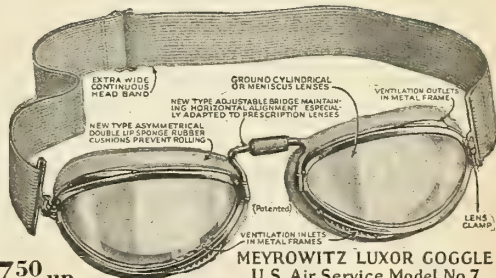
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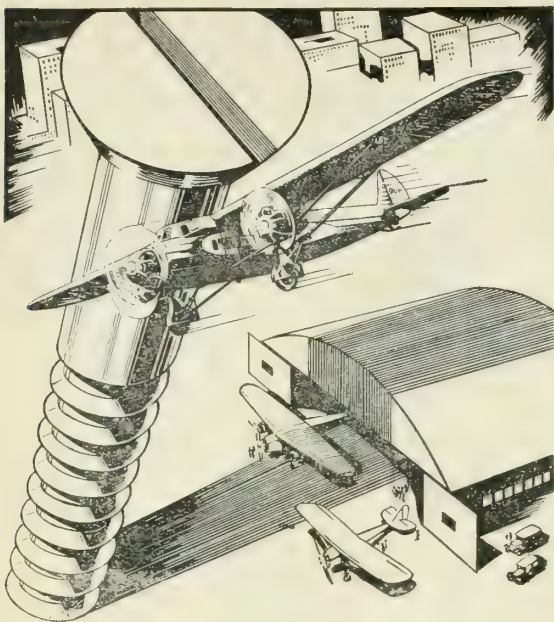
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(Continued from preceding page)

camera, are dripping wet from the condensation.

There are not only no aids or helps for the photographer, but there are none for the pilot either. Strip maps, beacons, emergency fields, radio communication, lighted airways—all these things are unknown in the primitive wilds of Mexico's interior. When he takes off, the pilot is placed absolutely on his own resources until his wheels touch the ground again after his flight. Quick thinking often saves his life, and experience gained in thousands of hours of flying in all sorts of weather and all sorts of airplanes often means the slender difference between a safe return and oblivion.

No better illustration could be given of this condition than an episode in the life of Pilot W. H. Kennedy, of the Mexican Aviation Company, then a Fairchild subsidiary. He and I had been flying on a survey of uncharted jungle country in the interior, after which he left me and went north to Tampico to resume his flying on the mail and other work, among which was the job of flying to various outlying mining camps and engineering projects in a Wright-powered Stearman. These expeditions were for the purpose of taking a paymaster in the front cockpit with the weekly pay-roll for the boys at the camp, contained in heavy sacks of coins. Upon arrival at the camp, he would circle about until the noise had attracted the foreman's attention, whereupon he would come down to a few feet and the paymaster would drop the sacks of coins.

On one occasion Kennedy started off accompanied by the paymaster from an oil company, who had some 50,000 pesos in gold coins done up in the usual stout canvas bags. The destination was an oil camp some 140 miles southwest of Tampico on the lower slopes of the Sierra Madre range. It is no wonder that we are called upon to make aerial surveys in Mexico, for Kennedy's map showed a fork in the river at the point where he was to turn due west and find the destination some ten miles farther on. Since no such fork appeared, Kennedy proceeded to follow the stream a few miles farther before re-checking his map. Presently the scenery changed with lightning-like rapidity. He was in a gorge, still following the river, and the cliffs on either side were rising higher than the rate of climb of his powerful biplane.

The canyon became so narrow that it was impossible to make a vertical bank to return, but even this did not worry the red-headed Kennedy, who decided to follow along a little farther until the gorge widened out. He had not gone a mile more before he discovered it was a blind alley, terminating with a flat rock cliff some 9,000 feet high.

By this time the canyon was so narrow that a turn in either direction was impossible. The plane could not climb out. And the cliff was approaching at the rate of 120 miles per hour.

Many persons have claimed that stunts were unnecessary and foolish. In this case, Kennedy's ability to stunt with a heavily loaded plane saved his own life and that of his passenger, the paymaster. He pulled the ship up on its back and executed a half roll; as pretty an Immelman as any army pilot ever pulled. He was then right-side up and going out of there at two miles per minute.

Eventually he found the camp, dropped his pay-roll and returned to Tampico. As soon as the wheels had stopped rolling, the paymaster, an Englishman, jumped out and came alongside, shouting: "I say, old top, were those—er—acrobatics absolutely necessary?"

Kennedy spat disgustedly over the side.

"You're darn tootin' they were necessary," he stated, with emphasis.

# AMERICAN TRANSPORT AVIATION GOGGLE



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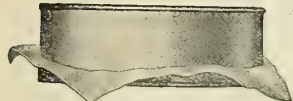
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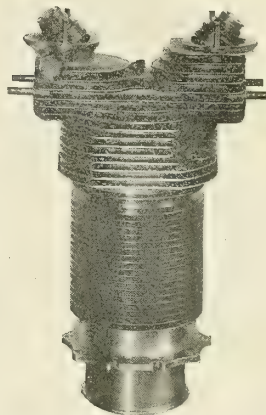
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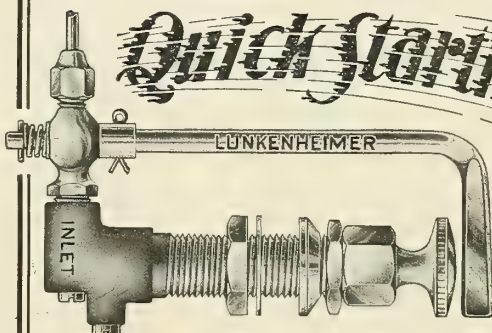


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## LABORATORY METHODS IN AERONAUTICS

(Continued from page 57)

at the same height no power is required directly to stay up. It is necessary to keep moving forward to stay up, and this requires power to overcome the air resistance. The force required to be exerted is, however, only one-eighth the weight lifted, a great advantage over a helicopter where a force equal to the weight must be provided by the propeller. Since moving forward to get somewhere and not merely to stay up is usually the main purpose of flight, all the power is spent in the useful task of getting somewhere. The power required does not compare at all unfavorably with that required in an automobile traveling over the ground at the same speed. In an automobile traveling at about one-half the speed of an airplane, only one-eighth the power is required, since at high speeds the automobile also spends nearly all its power in overcoming air resistance, the necessary power varying as the cube of the speed.

Wind tunnels as we know them now are a comparatively recent development, but similar, though less exact, methods were used by Langley and the Wright brothers and their contemporaries. Sometimes the wind was simply the natural wind, which is very unsteady and varies in direction rapidly. Sometimes the wind was an artificial wind through a small pipe, but at any rate, it was by experiment on a small scale checked by experiments on a larger scale in gliders that the air was finally conquered. By measurements on small, thin plates the advantages of curved wings over flat wings were discovered and the problems of balance and stability were partially solved without risk of life. For this reason it is believed that the application of model measurements was the decisive factor in expediting the conquest of the air.

## WEATHER AND AIR TRANSPORT

(Continued from page 52)

course for a pilot in the vicinity of a tornado is to steer his ship away from its vicinity. In this he but imitates his brother pilot of the sea by heeding the admonition contained in the old "Piddington's Horn Book" to utilize the winds within the cyclonic area.

In addition to the gyratory air currents in the vicinity of a thunderstorm, there are horizontal line-squalls. Gliders depend upon such winds in a hilly country to give them lift which, with gravity, furnish their motive power.

There are other winds of less dramatic quality, such as a variety of aerial cascades; the well known land-and-sea breeze; horizontal aerial drifts; the "Santa Ana" winds, the Foehn, the "chinook," and other downward-moving air currents.

Since every locality has its own particular variety of wind, air route maps ought to have them as well marked and clearly described as the rip-tides, the cross-currents and dangerous drifts on a shipmaster's chart.

In 1921, I completed two years of exhaustive tests with pilot balloons as weather indicators, and submitted these findings in a monograph to the Carnegie Institution of Washington. This was the first practical endeavor to utilize the now commonly accepted efficiency of the free-flying balloon-sound to forecast wind direction, velocity and visibility for the benefit of aviators. It was found that, in accordance with previously enunciated theories, all

(Continued on next page)

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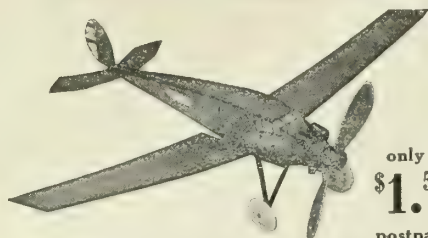
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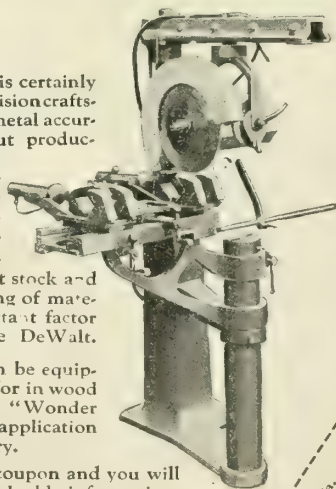
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(Continued from preceding page)

weather is made aloft, giving its first indication many thousand feet above the earth's surface. Although a weather map may adequately indicate set fair weather in its surface distribution, the little pilot balloons show the wind velocity and direction in a more reliable way than the best anemometers, anemoscopes or ventographs. All of these observations were made at the same average altitude, which was about one mile above sea level. During a period of eighteen months, which included two California rainy seasons, rain was correctly indicated for about five days in advance in twenty-three out of twenty-six times. Surface observations of pressure as indicated by the regular weather methods showed a surprisingly low percentage of correct predictions of incoming storms. Storm forecasts, based exclusively on surface observations depicted on the weather map, gave only twelve per cent verification or nearly the reserve complement of eighty-eight per cent balloon-sondes. Balloon observations indicate that, except where interference is caused by active barometric lows or highs, the wind direction in the latitudes of the United States generally changes clockwise with altitude. The clockwise change is attended by an increased wind velocity, which is especially noticeable after 1,000 feet altitude.

The use of sounding balloons at municipal airports has been general during the past few years. This is an excellent practice if supplemented by regular automatic registration of such meteorological elements as wind direction and velocity, temperature, humidity and cloudiness and rainfall. Meteorology of airports is a very important consideration, for it alone is the one factor which cannot be artificially altered. Local weather records secured from the nearest regular or unofficial observer are useful and should be incorporated in all reports on the meteorology and climatology of proposed airport sites, but nothing can ever replace the preliminary data secured from the records of a complete meteorological observatory properly equipped with self-recording instruments supervised by a trained meteorologist. The results should be studied, analyzed and synthesized by a meteorologist of known competency and experience. There are many instances where millions of dollars of equipment and service have been sacrificed because of the insufficiency of meteorological knowledge. This is not only true of airports, but of airways and air pilots. In the increasing complexities of air transportation, meteorology is now admitted to be of extremely great importance.

Paper presented before a meeting of the American Society of Civil Engineers.

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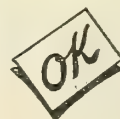
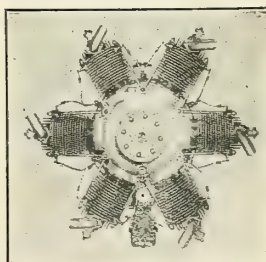
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## DYNAMICS OF SOARING FLIGHT

(Continued from page 63)

between airplane and earth, the wind's speed may be reduced and the equivalent of the energy thus released appropriated to sustain the airplane's flight. This is within theoretical possibility.

A dynamic reasoning that has been advanced to demonstrate that soaring on energy derived from a uniform wind is impossible, can be reduced to the following: Motion being entirely relative, a motion—especially one of a uniform velocity—with respect to some point outside a dynamic system may be imposed on the system without affecting in any way the internal actions and reactions in the system. If the dynamic system of the flight of an airplane were a two-body system involving only the airplane and a mass of air in its vicinity, the inference would be inescapable that soaring flight deriving energy from a uniform wind is impossible. The fact is, however, that the uniform wind does not involve the entire dynamic system in a uniform motion; it may include the airplane and the air, but it does not include the earth. The reasoning against soaring flight cited is inapplicable.

The bodies in the flight problem are, then, the earth, the airplane, and a mass of air. The mass of air changes its identity from instant to instant, so that, in case a wind is blowing, the mass of air just coming into action always has the velocity of the wind relative to the earth.

The interactions between the three bodies of the dynamical system may be described as follows: The mass of air is in gravitational equilibrium with respect to the earth, whether or not it is a part of a uniform wind. The mass of the airplane is connected to the mass of the earth by a gravitational stress, and is connected to a mass of air by a mechanical or impact stress. The airplane may have a velocity variable in either direction or magnitude with reference to air or earth. The movements of the earth have, of course, no measurable significance.

It is possible to predict from the principles of dynamics the essentials of the flight maneuver that would result in flight supported by energy of a uniform wind. The motions of the airplane may be separated into (1) that part resulting only from the airplane's mechanical action on the air surrounding it, and (2) that part resulting from gravity or inherent to the gravitational stress. If a flight maneuver, in which the motion of the airplane resulting from gravity or inherent to the gravitational stress acts to slow down the wind progressively by its repetition (even if only during transient periods), can be discovered, energy for soaring can be derived from a uniform wind. If the airplane's dynamical relation with the earth can give the airplane a motion to slow down the wind, this relation with the earth will be analogous dynamically to the stress in the kite string between kite and earth. It may be that the motion of the airplane necessary to satisfy these dynamical conditions has not been discovered, but what man can say it never will be? The possibilities in this direction have, as yet, certainly not been exhausted by research.

It has often been asked, if energy for soaring flight may be derived from a uniform horizontal wind, why should it not be derived from the rotation of the earth? The answer is simple. All three masses in the flight dynamics are involved equally in the rotation of the earth. If a string could be run from the airplane to a neighboring mass, such as the moon, not involved in the earth's rotation, the energy of the earth's rotation would be a very satisfactory

(Continued on next page)

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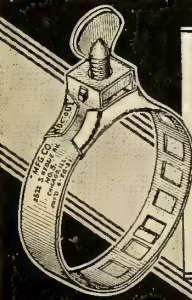
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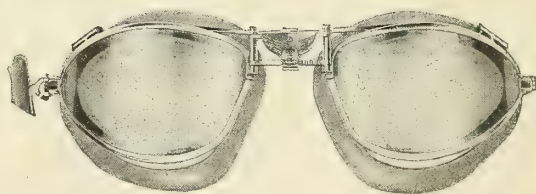
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(Continued from preceding page)

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Let us now perform the obsequies and bury forever, where it can do no more harm, the most insidious of all the "proofs" that soaring on a uniform horizontal wind is impossible. This "proof" has been advanced in writing by a member of the National Advisory Committee for Aeronautics and is in substance as follows: A very large box car is assumed moving on a straight track at a uniform speed relative to the earth. This box car contains a bird and a large volume of air moving with the car at a uniform velocity relative to the earth. It is evident that the bird could not soar in the box car.

This conclusion is quite correct, but the inference that the deduction can be extrapolated to apply to the bird in a uniform wind outside of the box car is vicious.

The example is quite amenable to dynamical analysis. The bird, whether standing on the box car floor or in flight in the box car, weighs on the wheels of the box car. The weight falls first on the box car and is from there transmitted to the earth through the wheels. A lecture experiment that used to be quite popular was to place a fly in a light bottle and show that both fly and bottle weighed together on the scales, whether or not the fly was in flight. When the fly was let out of the bottle the withdrawal of the fly's weight from the scales was very evident.

According to the principles of dynamics, the bird in the box car weighs with the car on the wheels. A reaction on the rails supports the box car, bird and all. Insofar as any dynamic action within the car is concerned, the weight of the bird may be replaced by an equivalent stress between the bird and box car. The earth may then be removed hypothetically to a stellar distance. The box car continues moving with the same uniform velocity with reference to the spot where the earth was. It is now perfectly clear that bird, box car, and air inside, all partake equally in this uniform velocity. Conditions are dynamically the same as if the bird were trying to soar outside of the box car on a perfectly calm day.

If a blower were now started up in the box car to circulate the air so that the bird found itself in a uniform wind within the box car, conditions dynamically would be exactly the same as if the bird were trying to soar outside of the box car on a windy day.



If the bird can soar inside the box car with blower going, he can soar outside of the box car on a windy day; if he can't, he can't. The box car example has contributed nothing but a record and verification of the confusion of thought existing on the subject.

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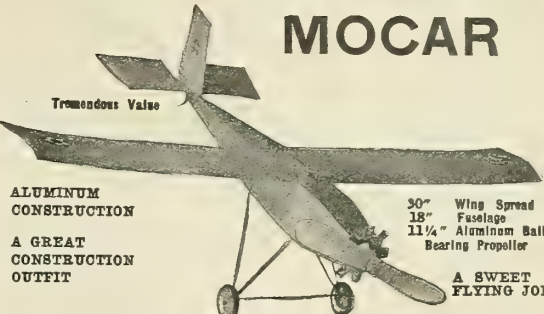
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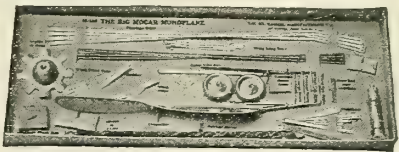
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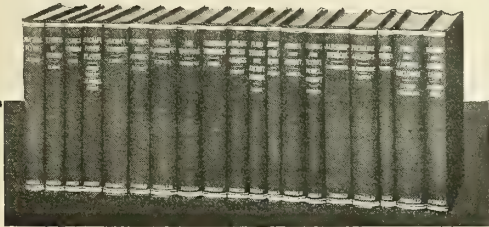


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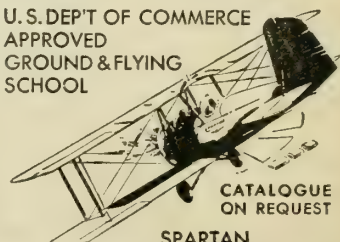
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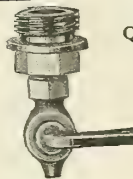
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(Continued on next page)



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